

FIG. 1

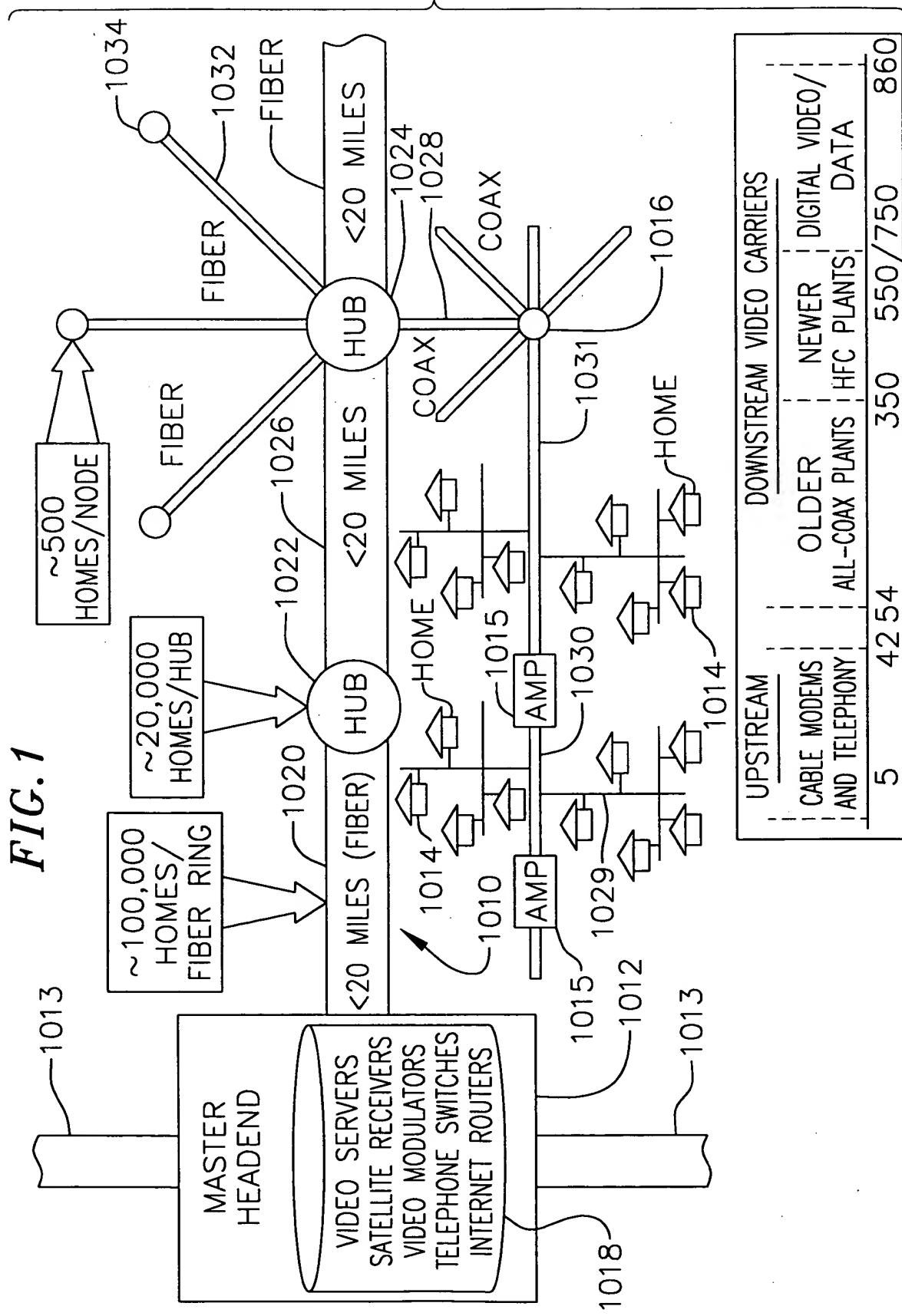


FIG. 2

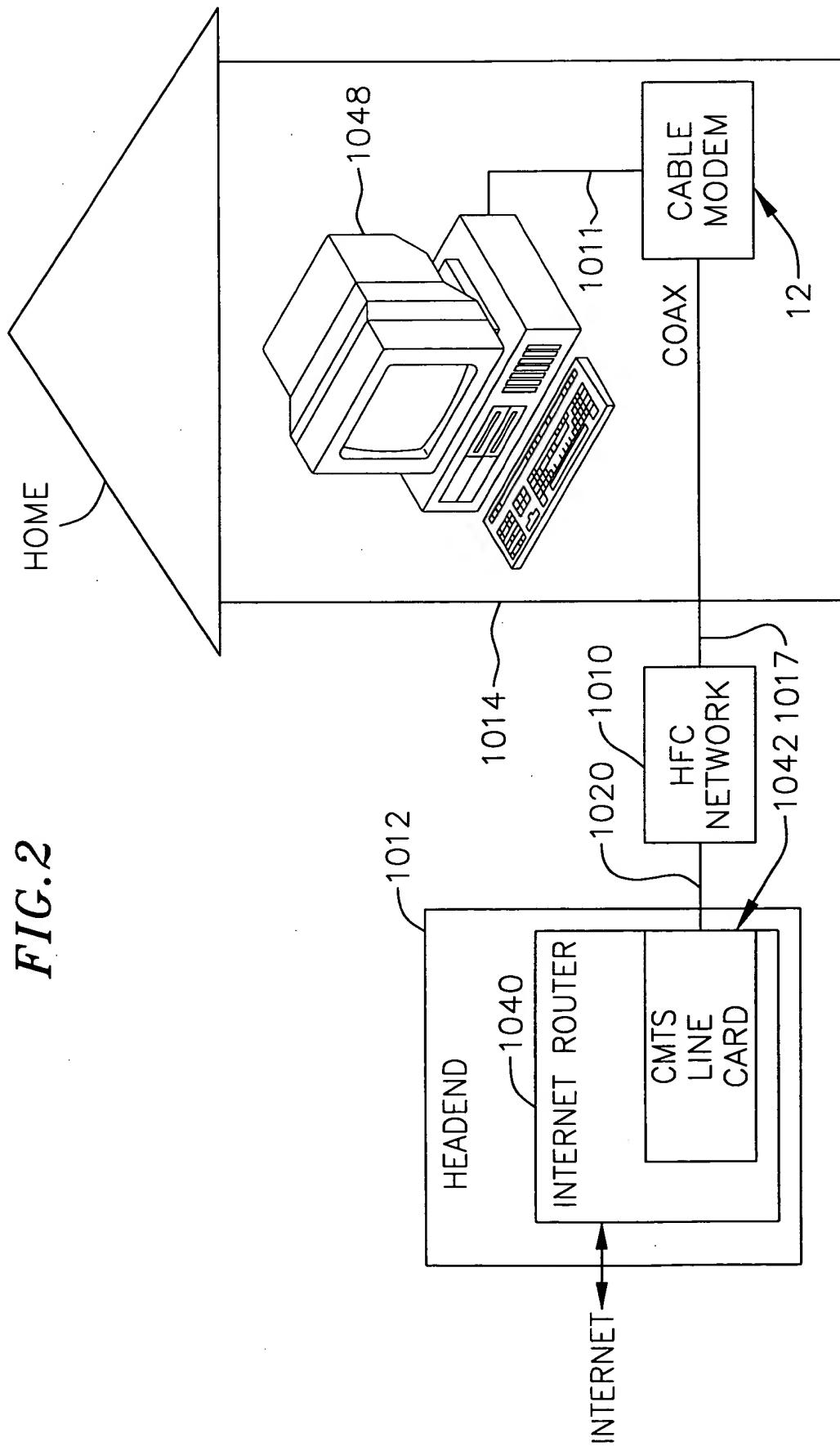


FIG. 3

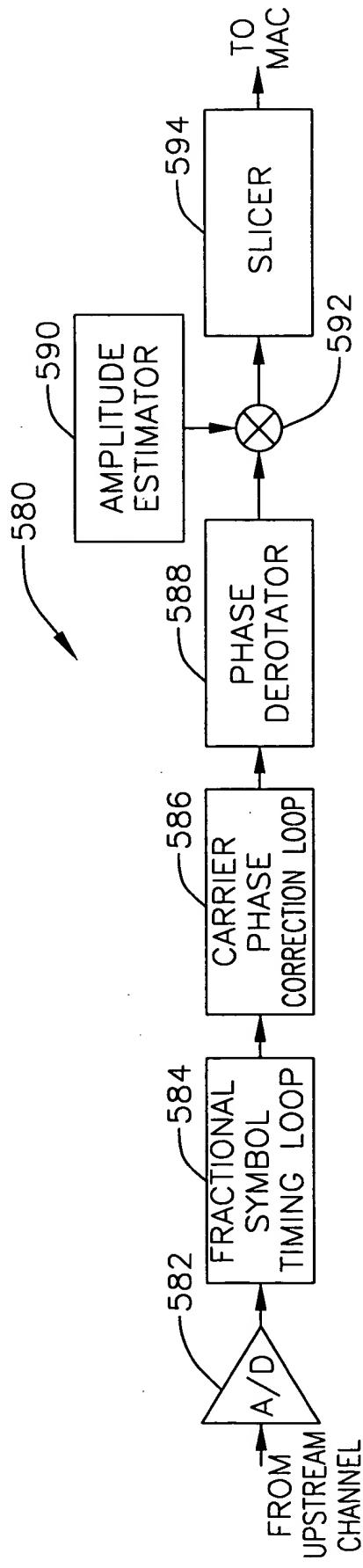


FIG. 4

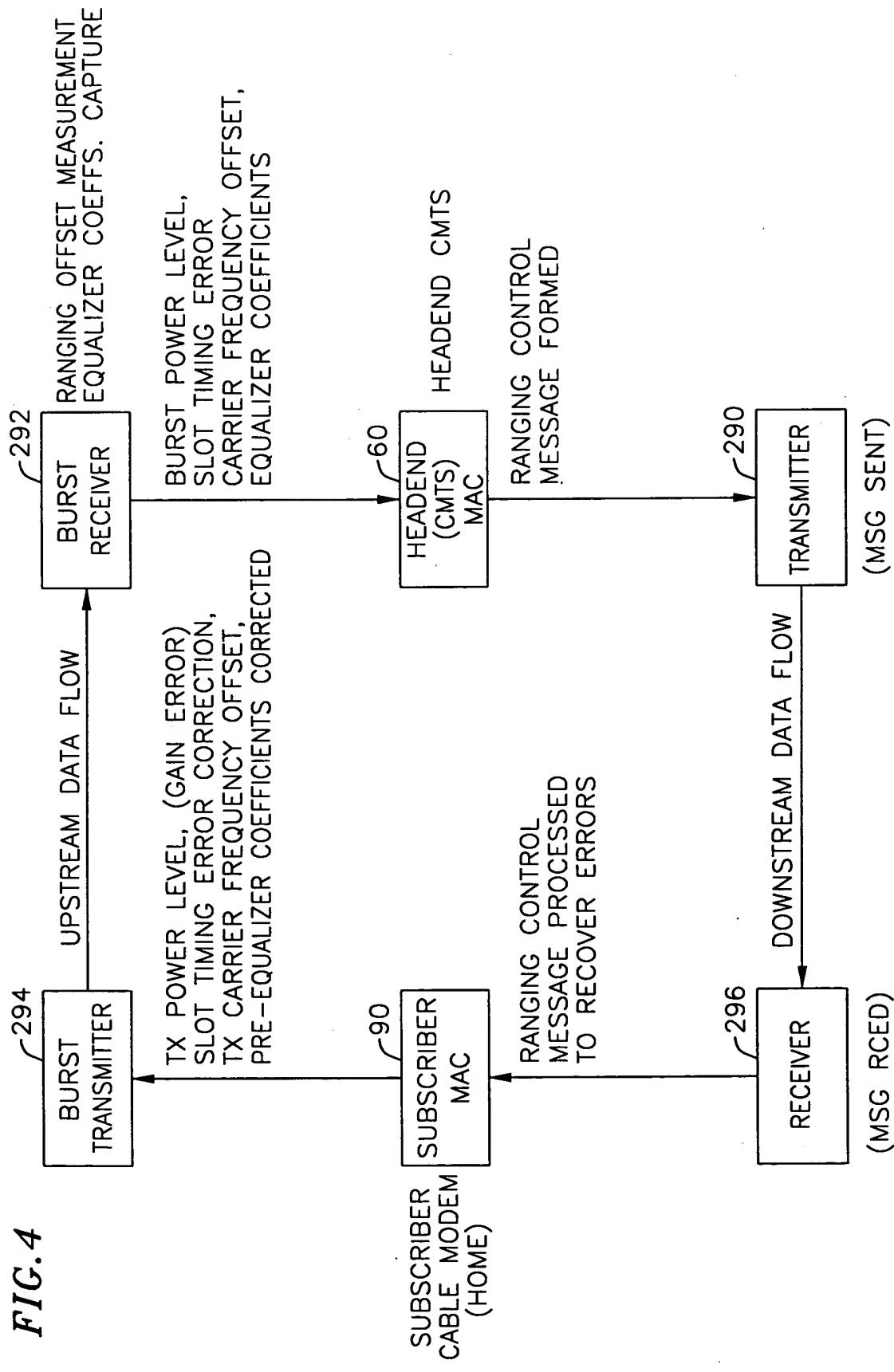


FIG. 5A

1042

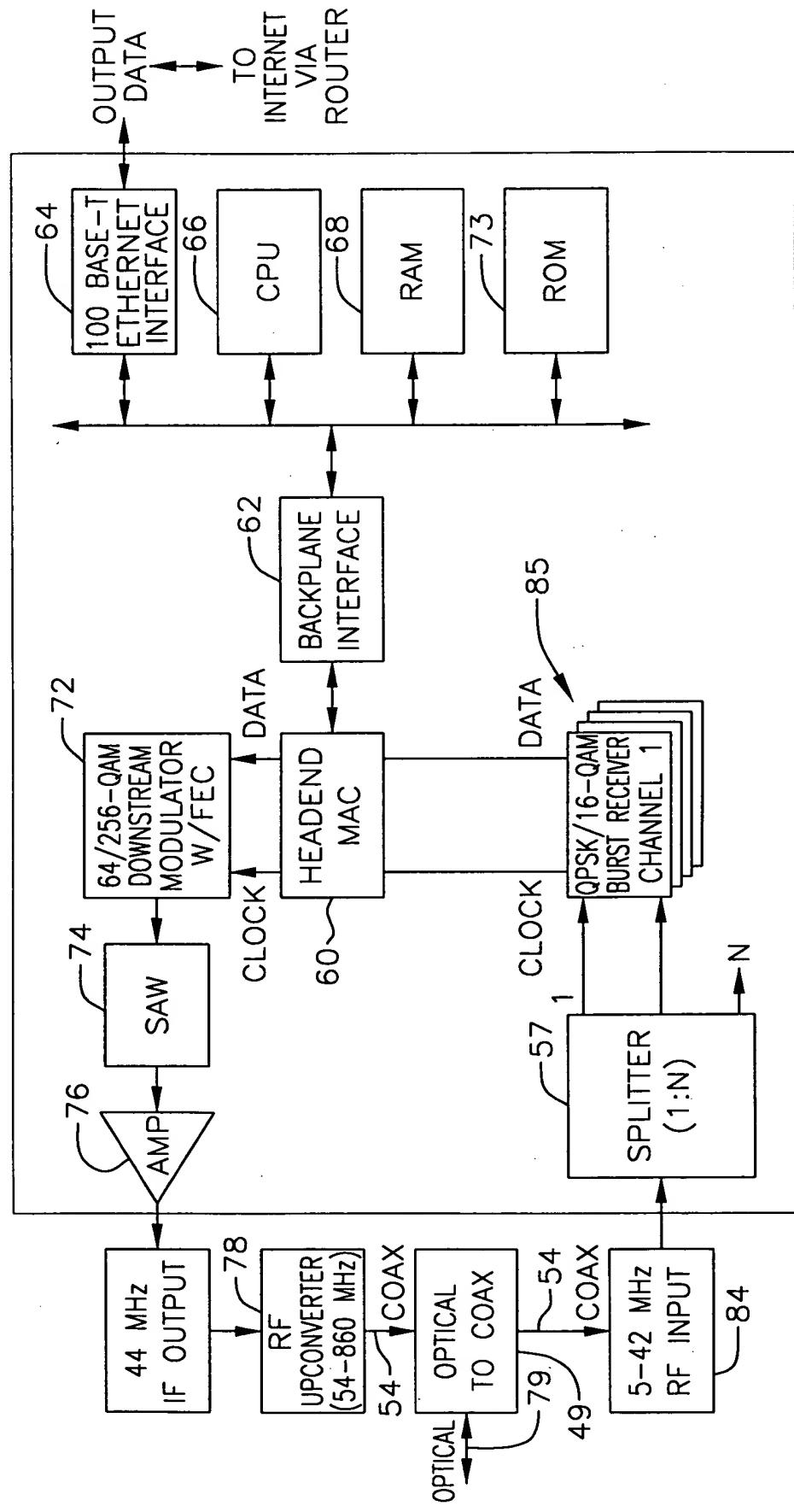


FIG. 5B

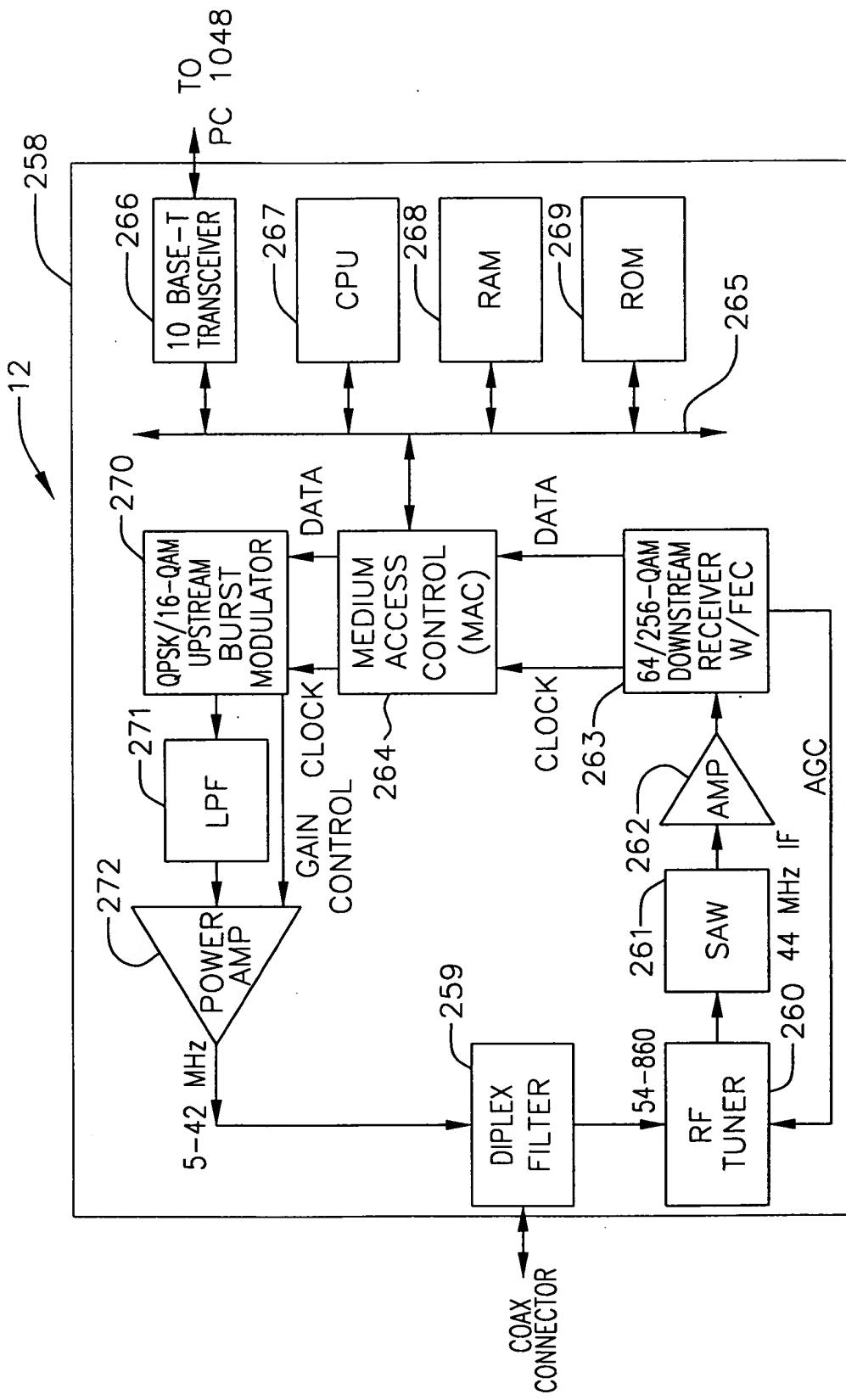


FIG. 6A

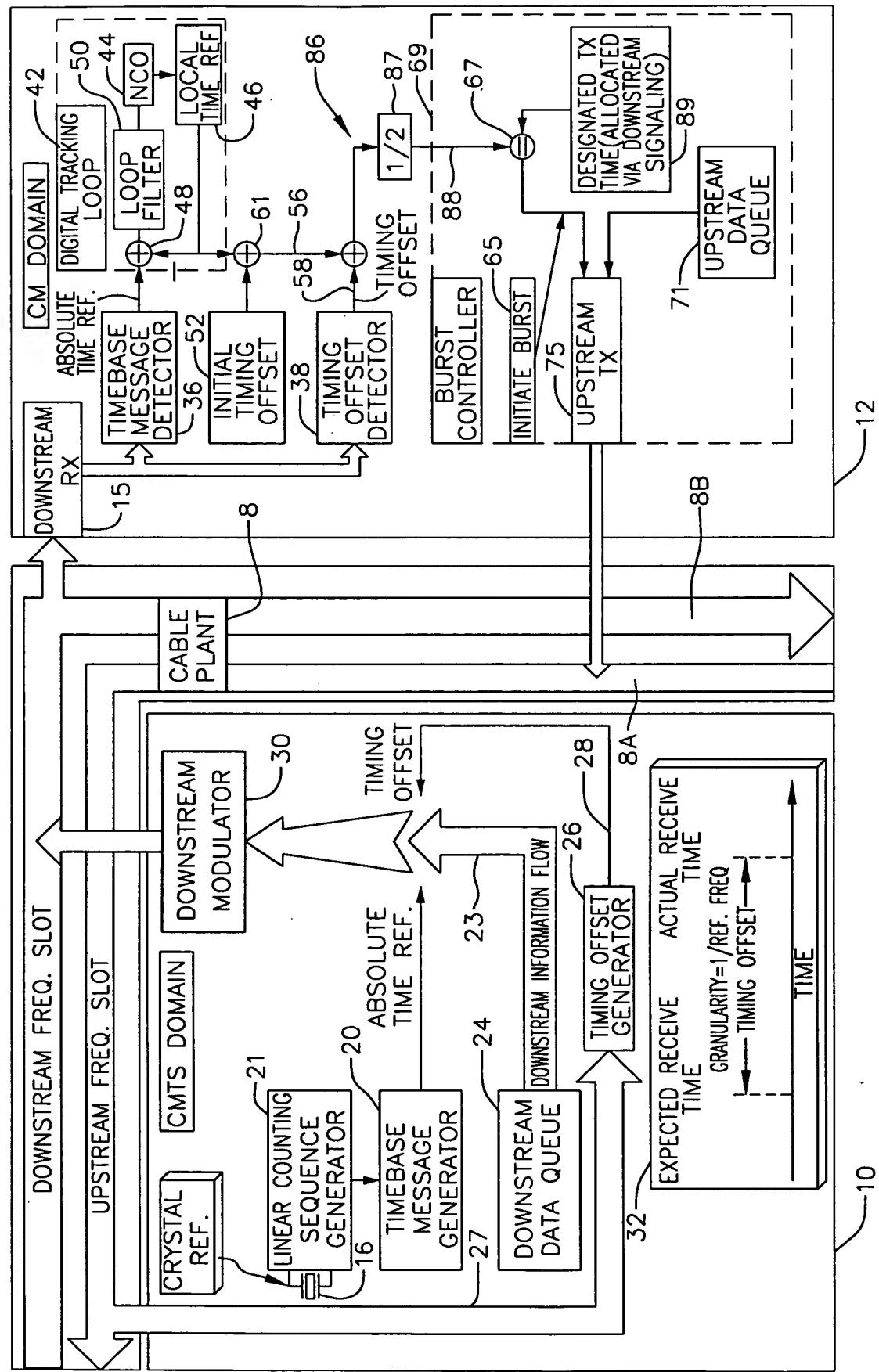


FIG. 6B

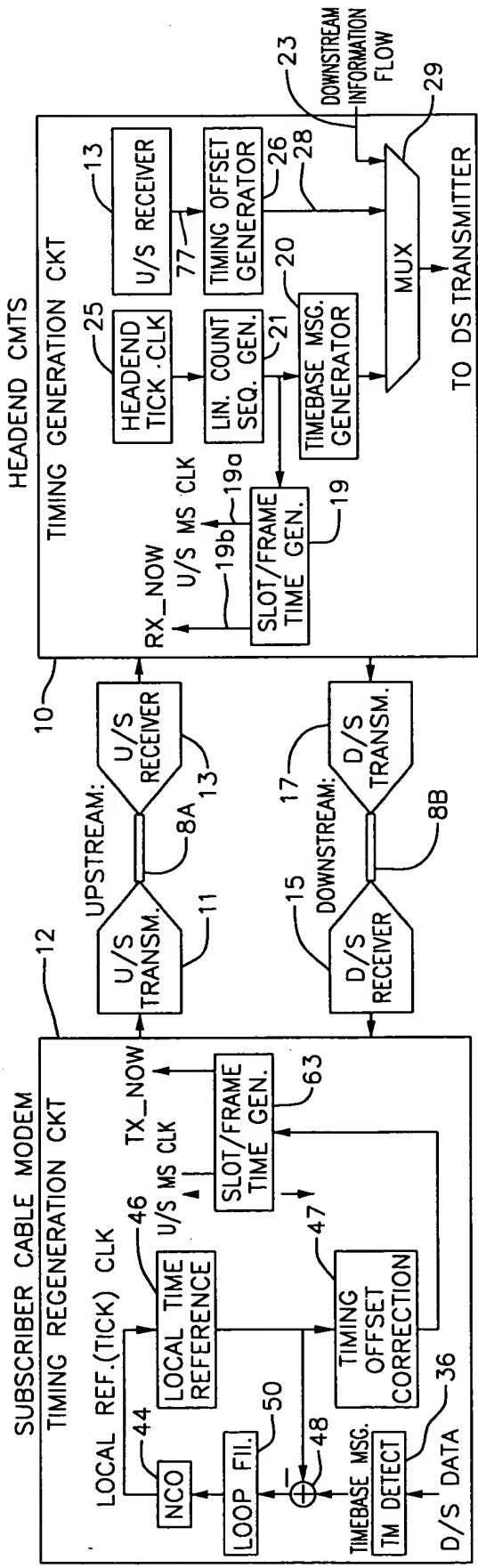


FIG. 6C

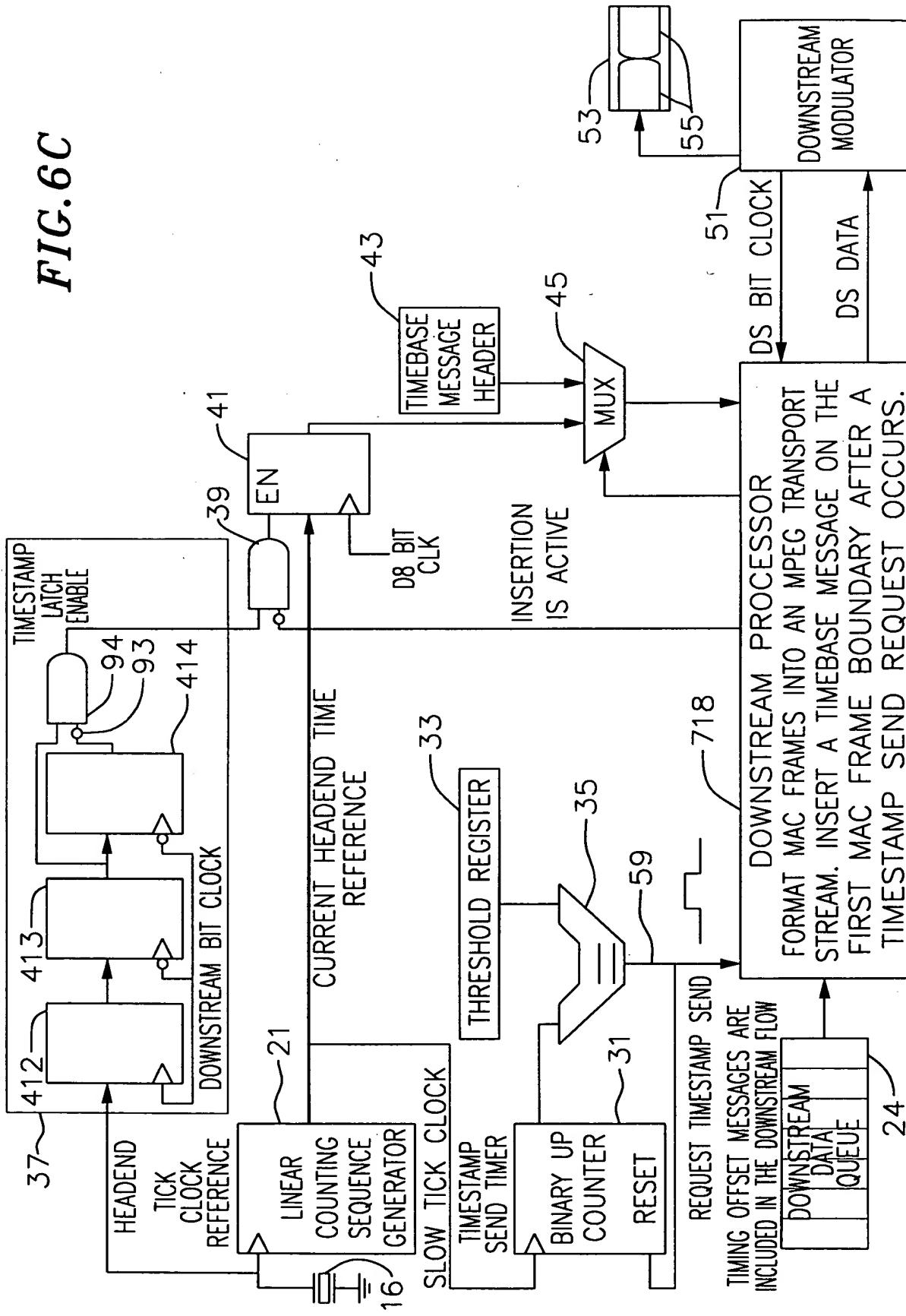
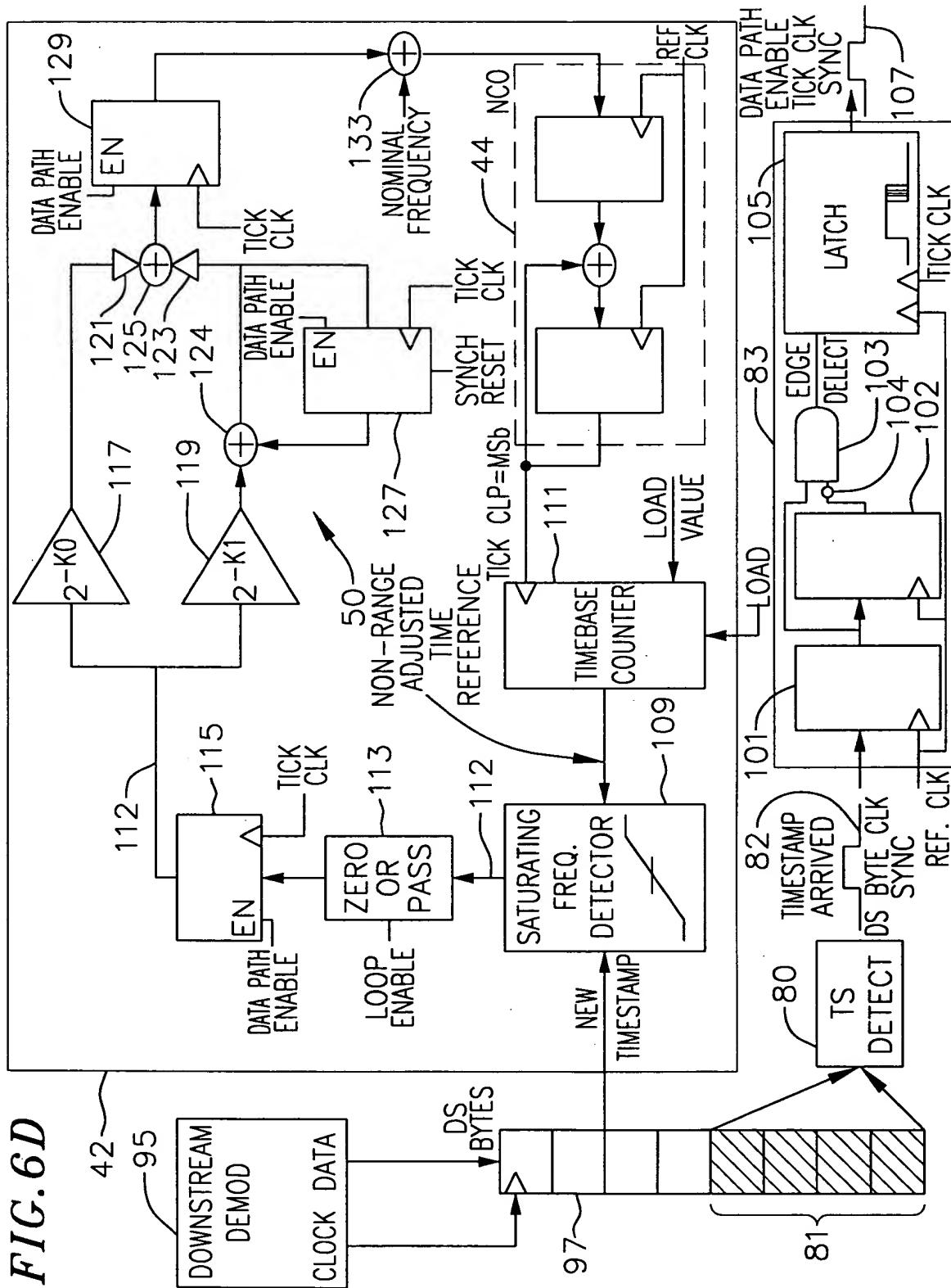


FIG. 6D



**FIG. 6E**

UPDATE RATE	COARSE COEFFS	FINE COEFFICIENTS
1kHz(1ms)	$K_0=2^{-11}$ $K_1=2^{-15}$ (BW=50Hz)	$K_0=2^{-16}$ $K_1=2^{-25}$ (BW=1Hz)
300Hz(3.3ms)	$K_0=2^{-12}$ $K_1=2^{-15}$ (BW=20Hz)	$K_0=2^{-16}$ $K_1=2^{-23}$ (BW=1Hz)
100Hz(10ms)	$K_0=2^{-13}$ $K_1=2^{-16}$ (BW=10Hz)	$K_0=2^{-16}$ $K_1=2^{-22}$ (BW=1Hz)
50Hz(20ms)	$K_0=2^{-14}$ $K_1=2^{-17}$ (BW=5Hz)	$K_0=2^{-16}$ $K_1=2^{-21}$ (BW=1Hz)
30Hz(33ms)	$K_0=2^{-15}$ $K_1=2^{-18}$ (BW=3Hz)	$K_0=2^{-17}$ $K_1=2^{-21}$ (BW=1Hz)
10Hz(100ms)	$K_0=2^{-17}$ $K_1=2^{-20}$ (BW=1Hz)	$K_0=2^{-17}$ $K_1=2^{-20}$ (BW=1Hz)
5Hz(200ms)	$K_0=2^{-18}$ $K_1=2^{-20}$ (BW=1Hz)	$K_0=2^{-18}$ $K_1=2^{-20}$ (BW=1Hz)

FIG. 7A

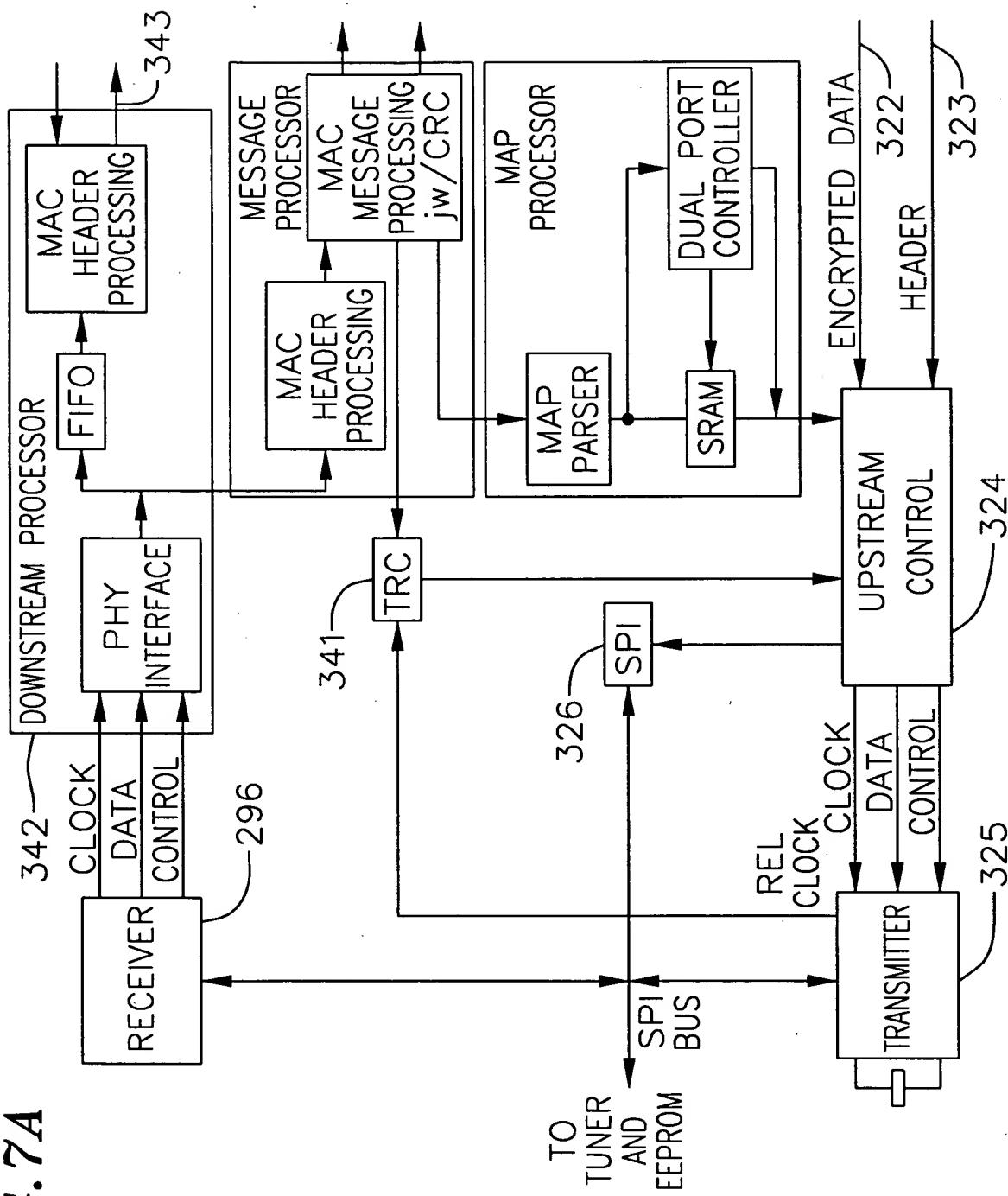


FIG. 7B

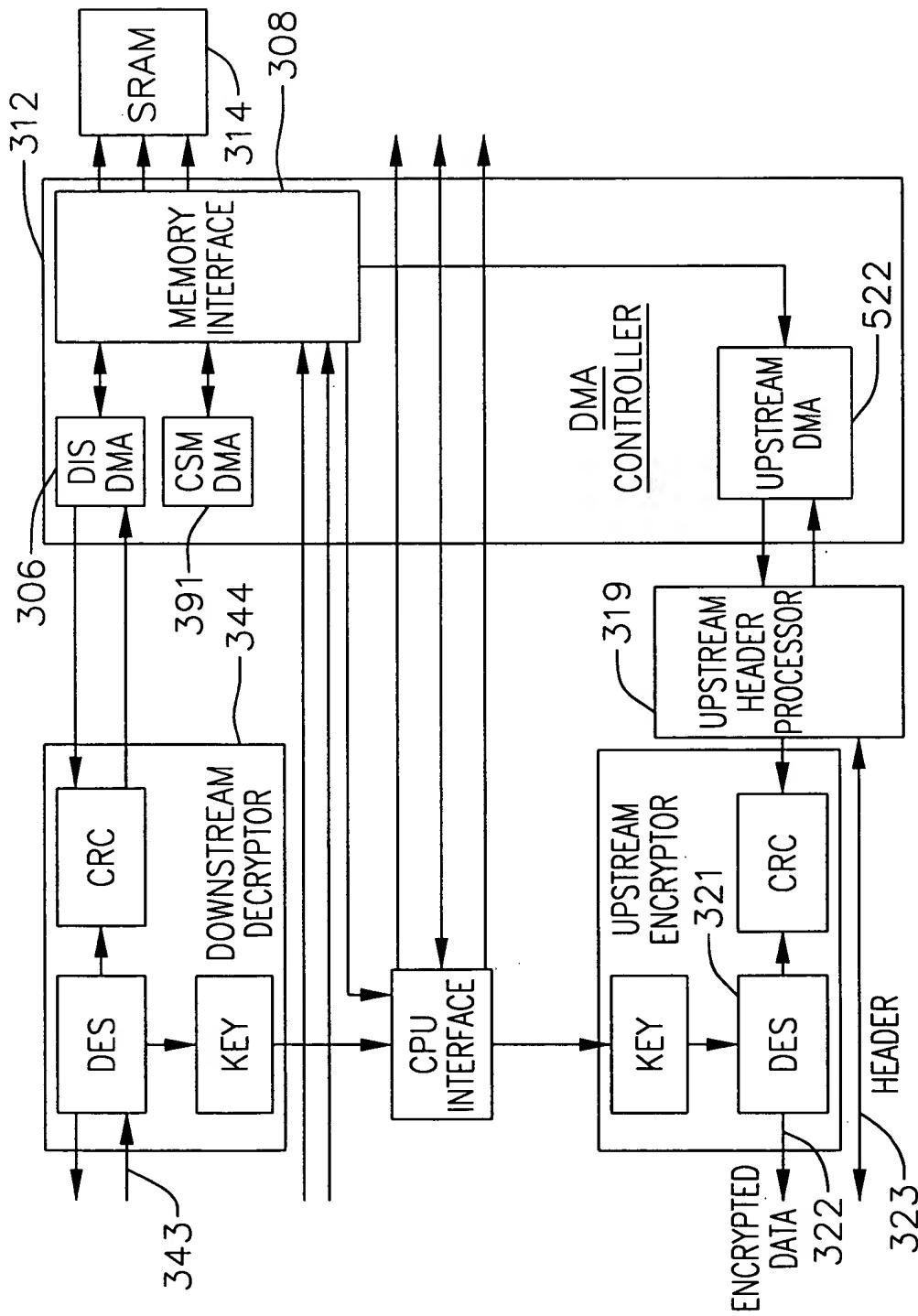
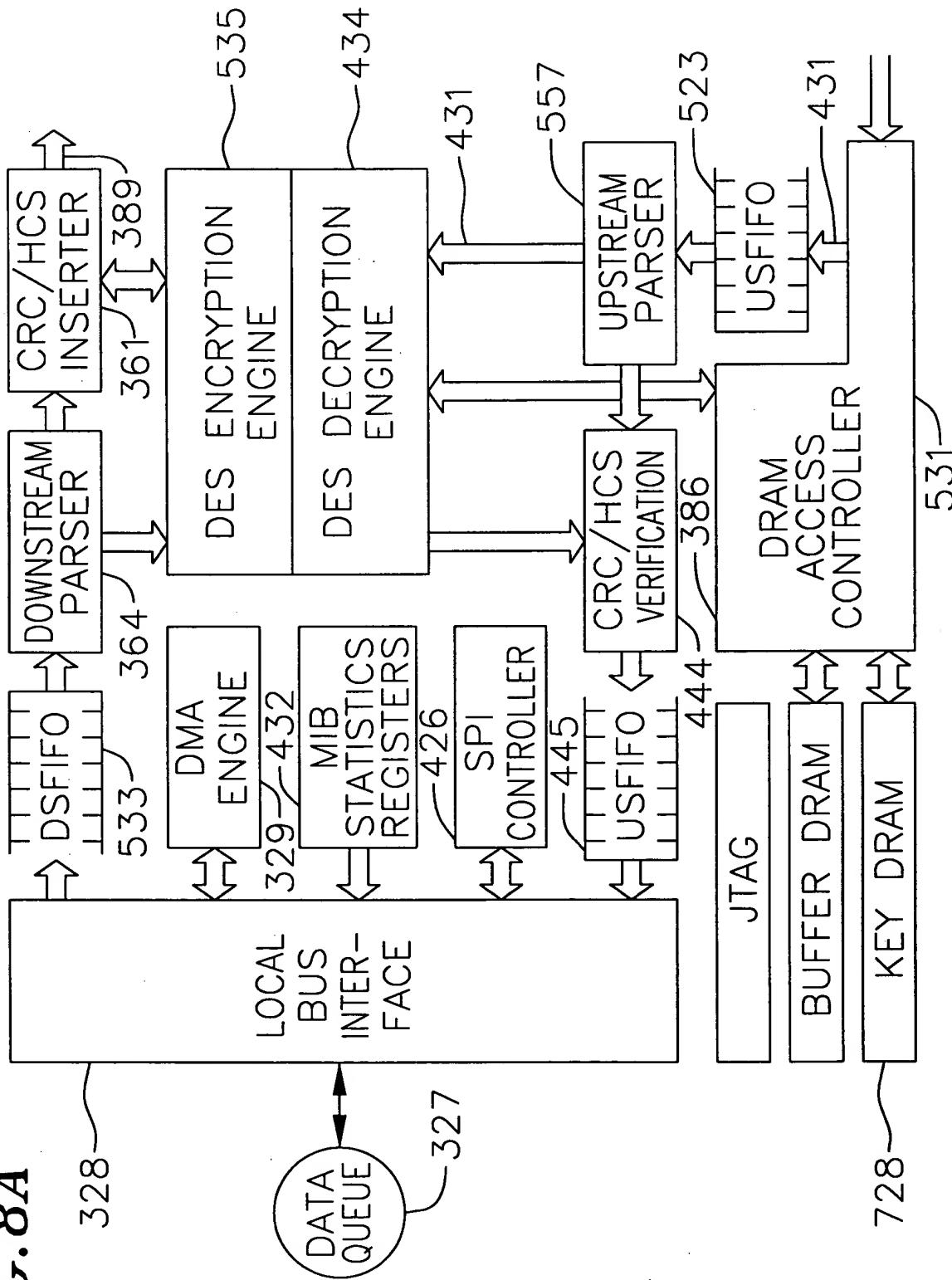


FIG. 8A



*FIG. 8B*

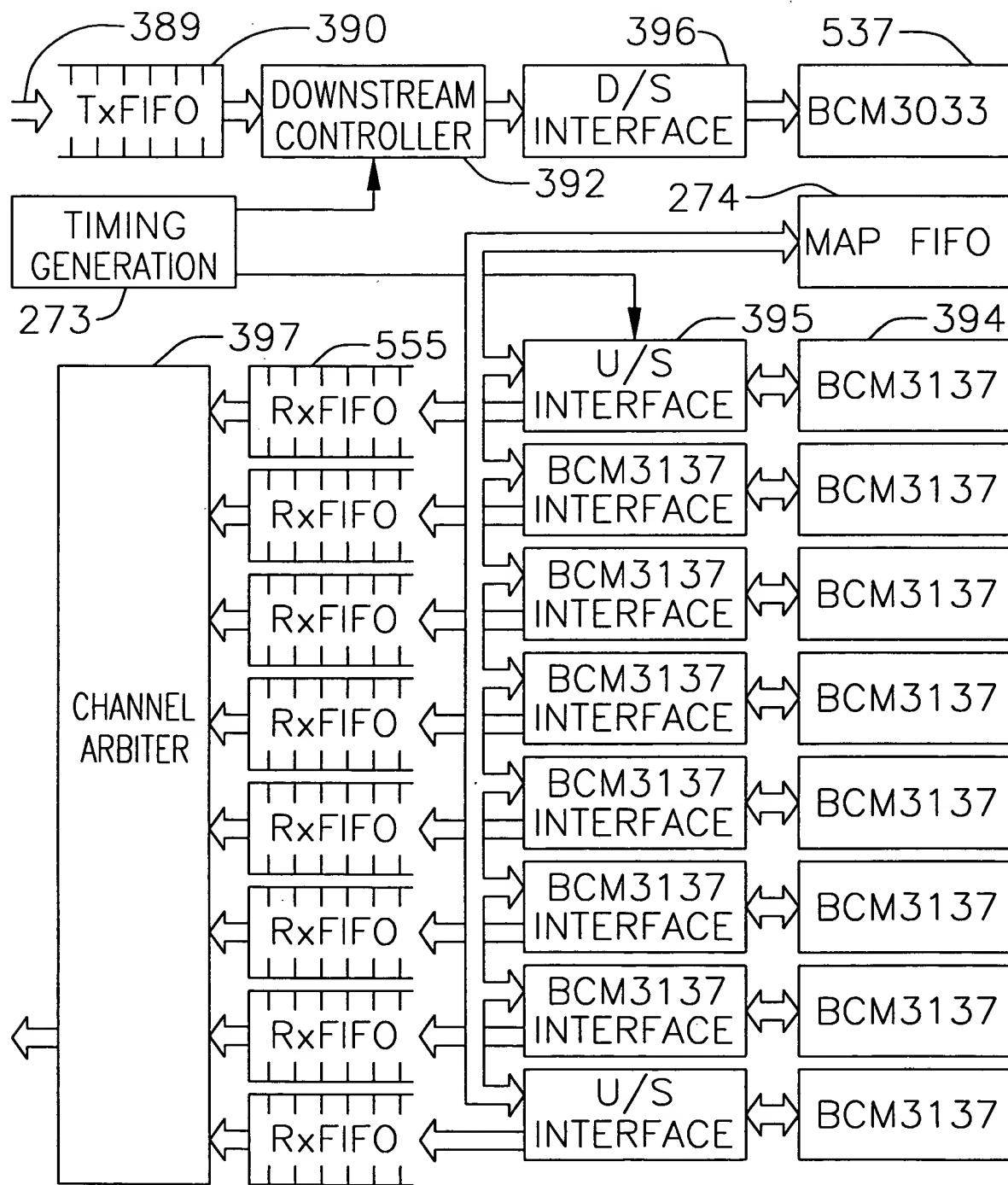


FIG. 9

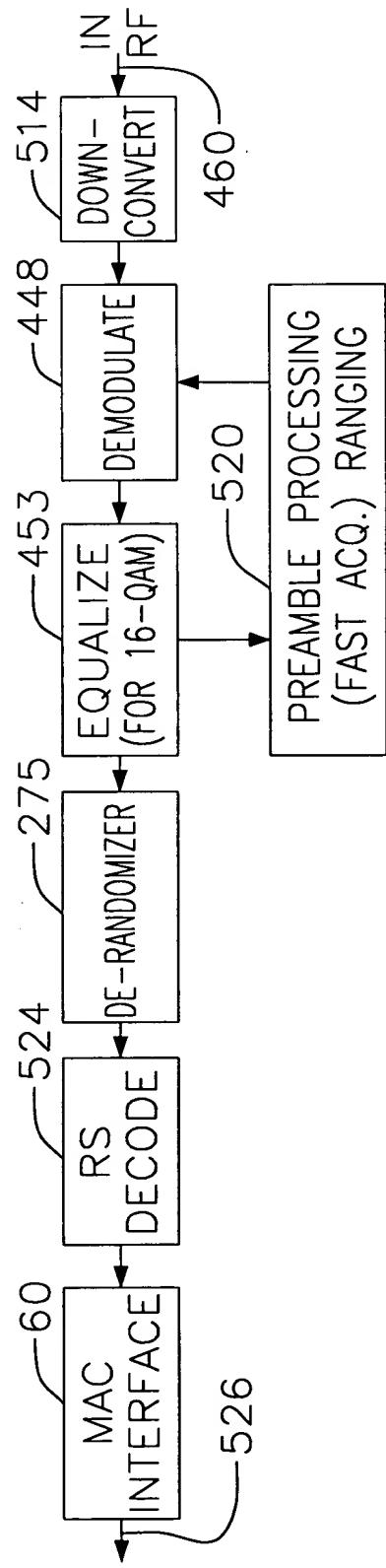
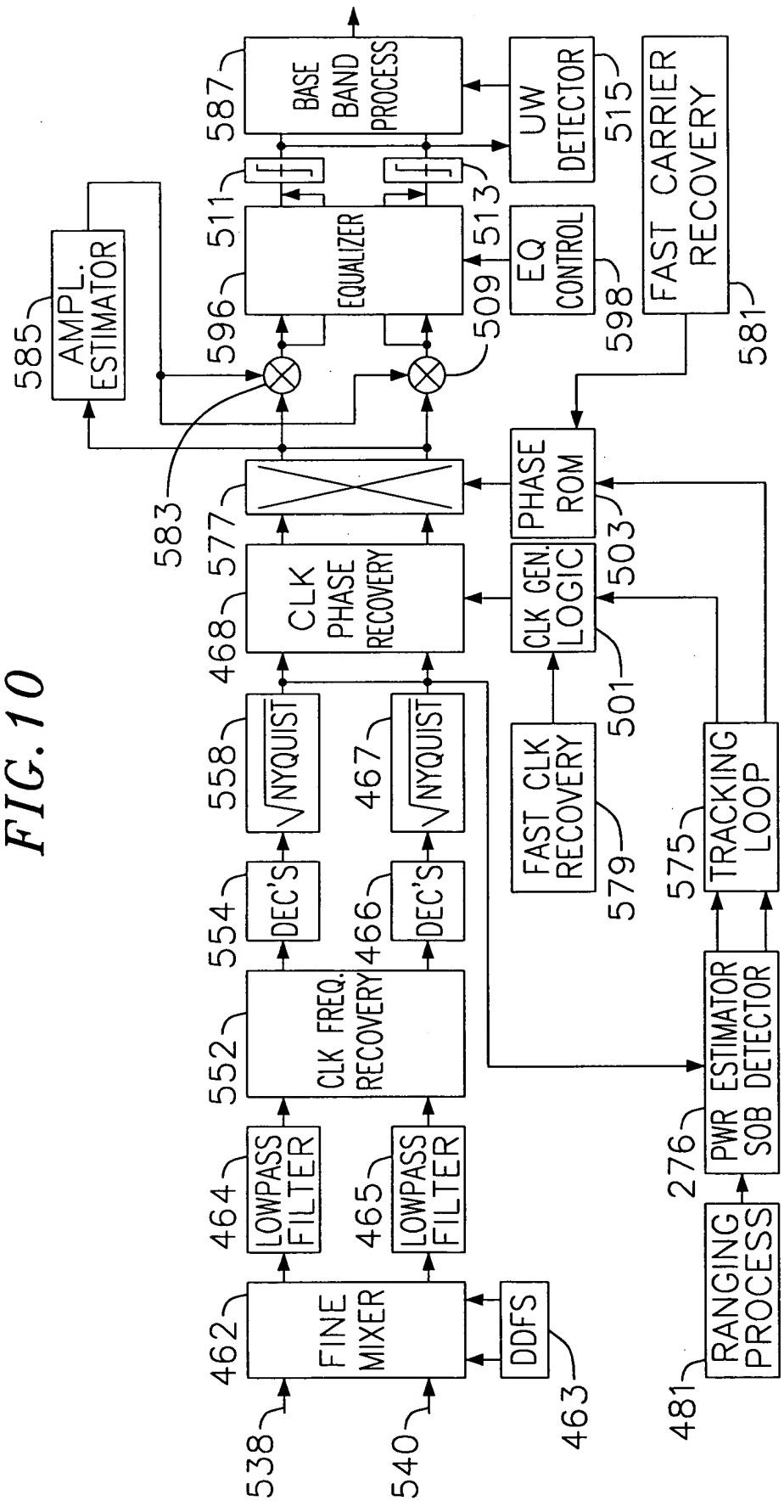


FIG. 10



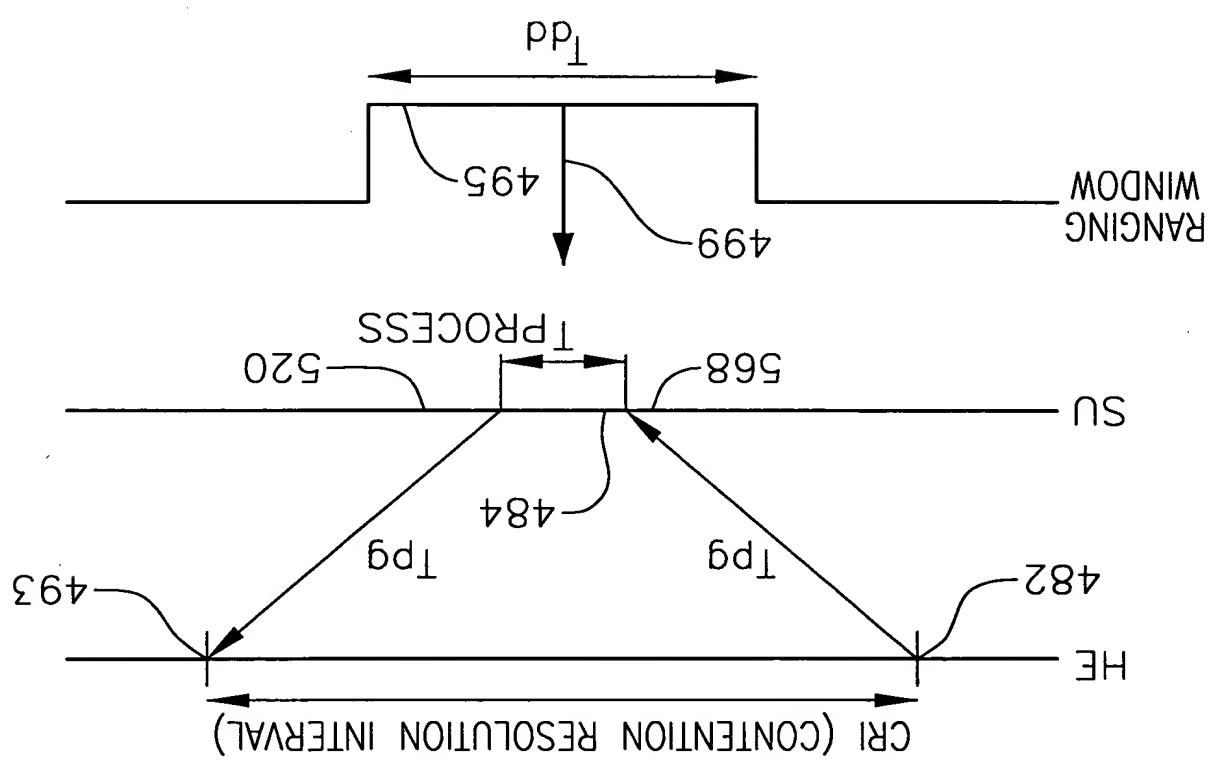
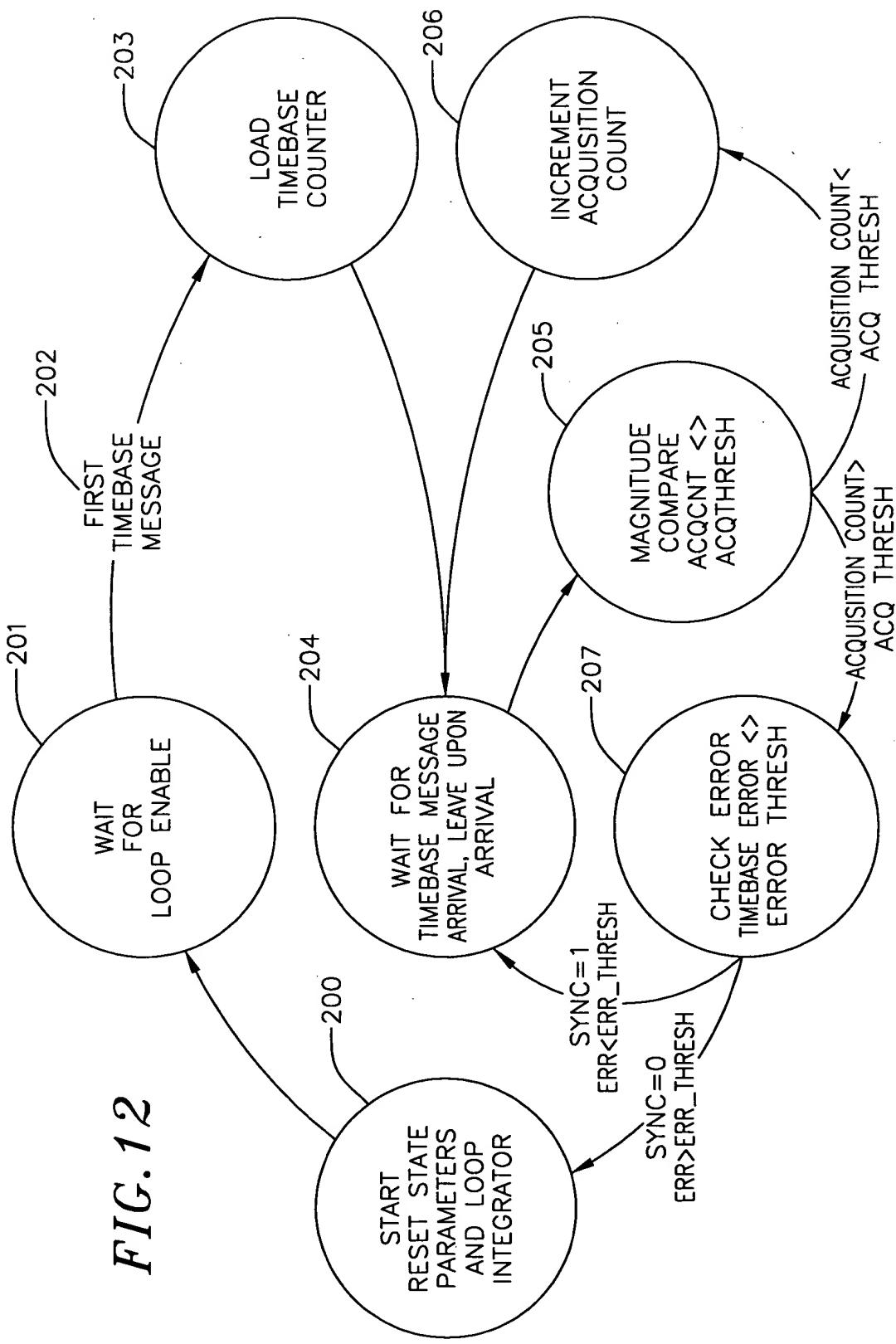


FIG. 11

FIG. 12



*FIG. 13*

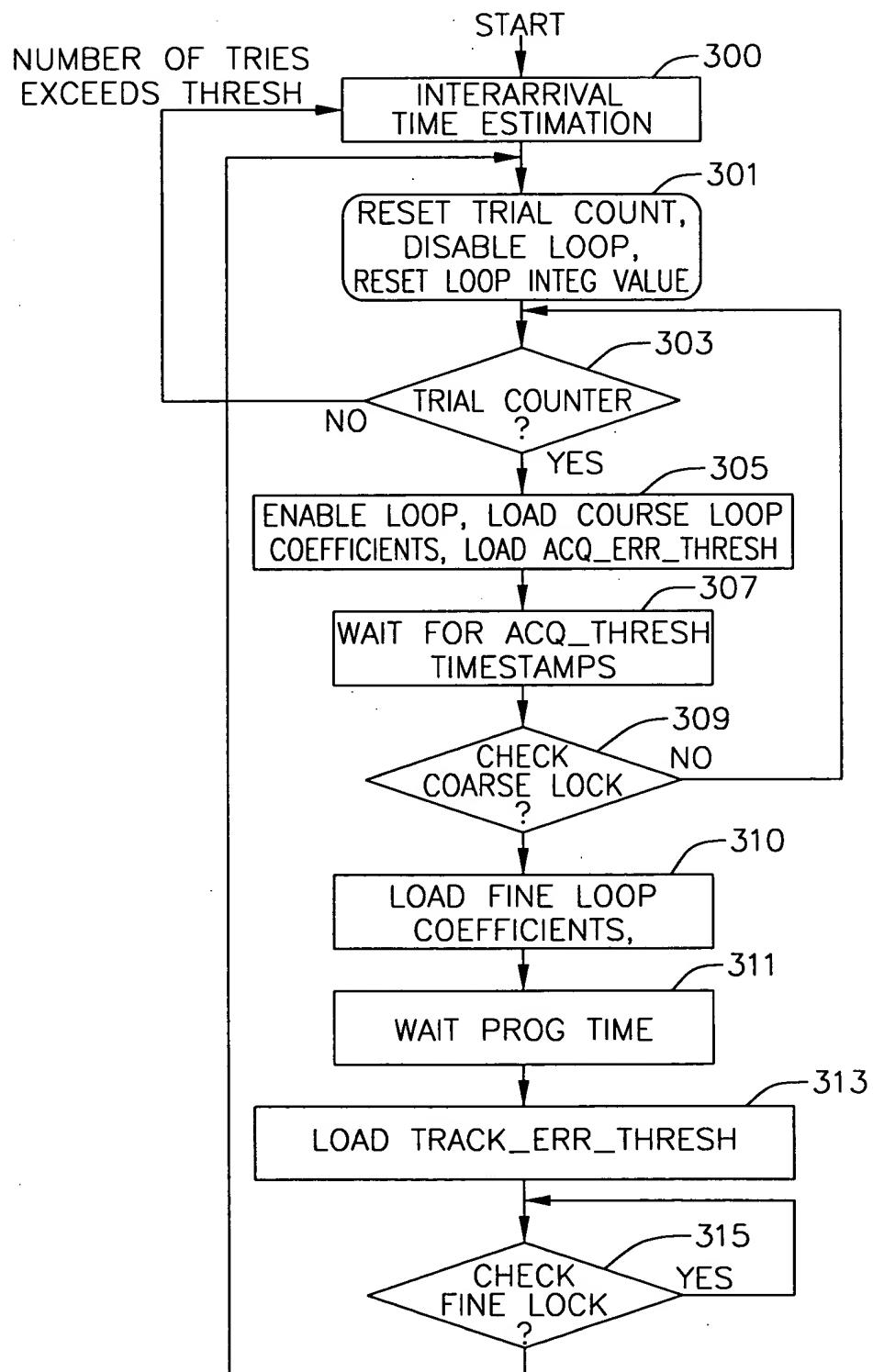


FIG. 14

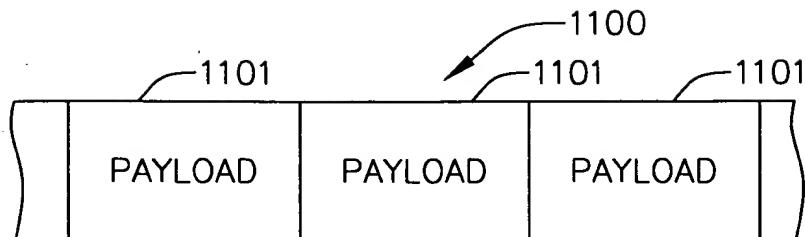


FIG. 15

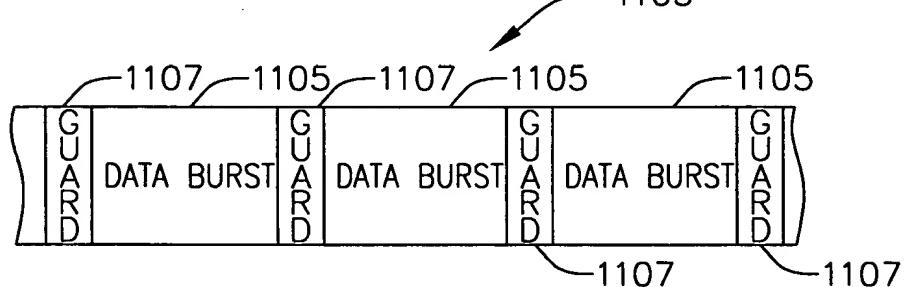


FIG. 16

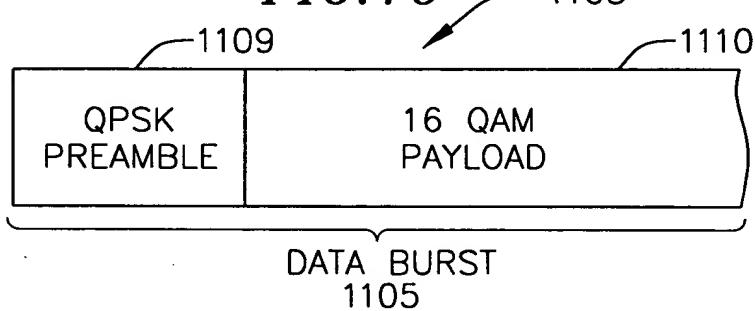
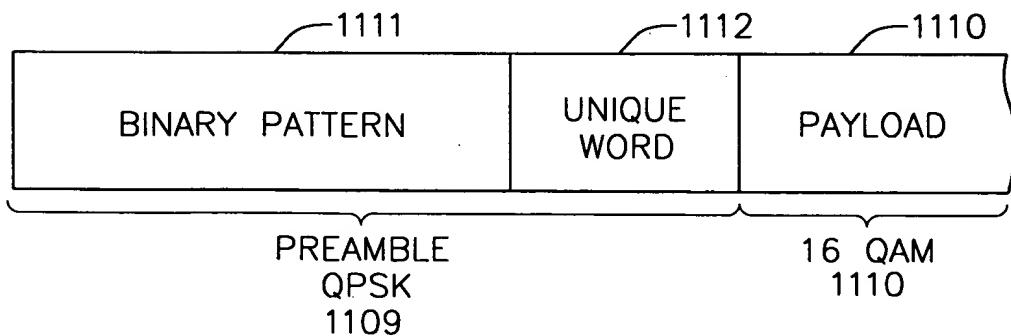
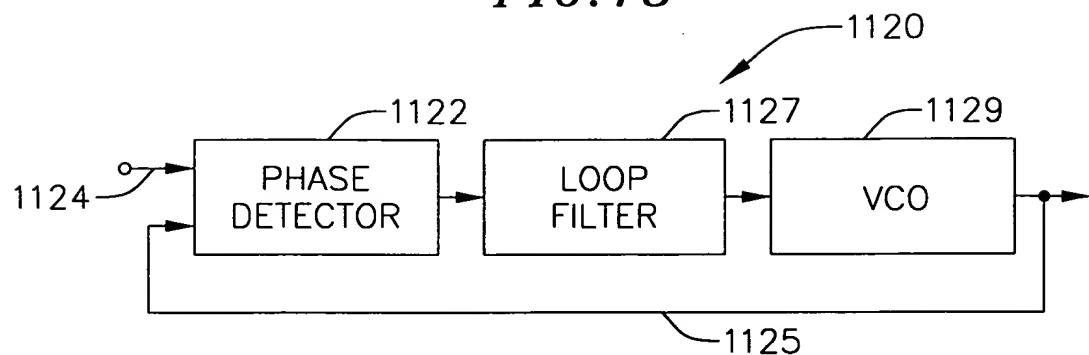


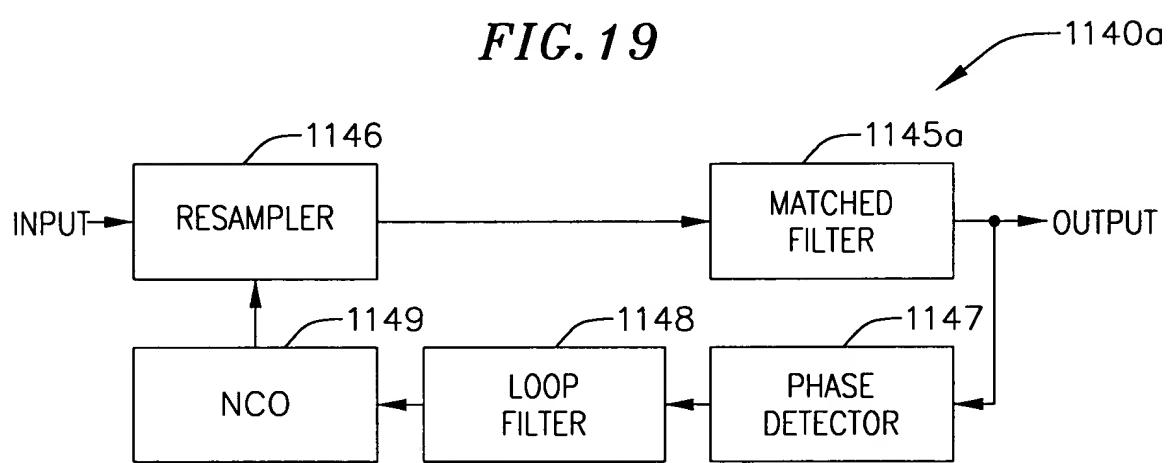
FIG. 17



*FIG. 18*



*FIG. 19*



*FIG. 20*

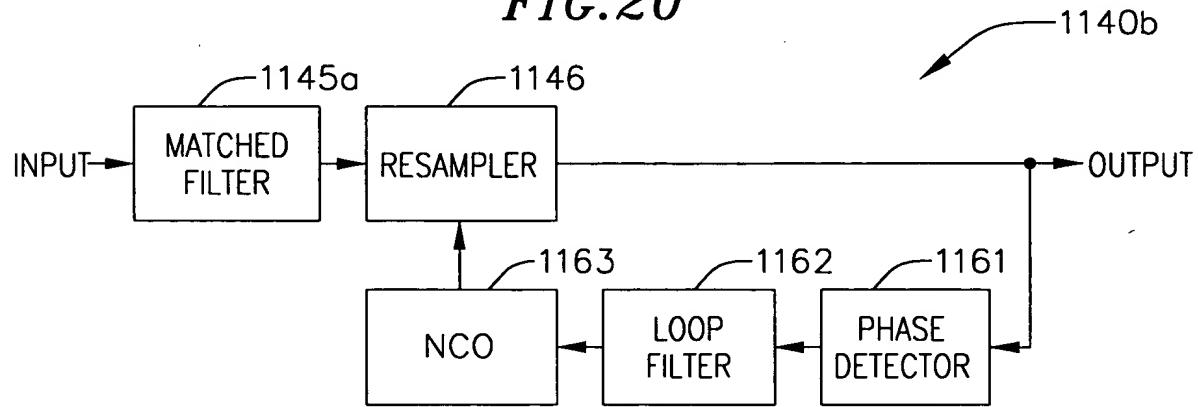


FIG. 21

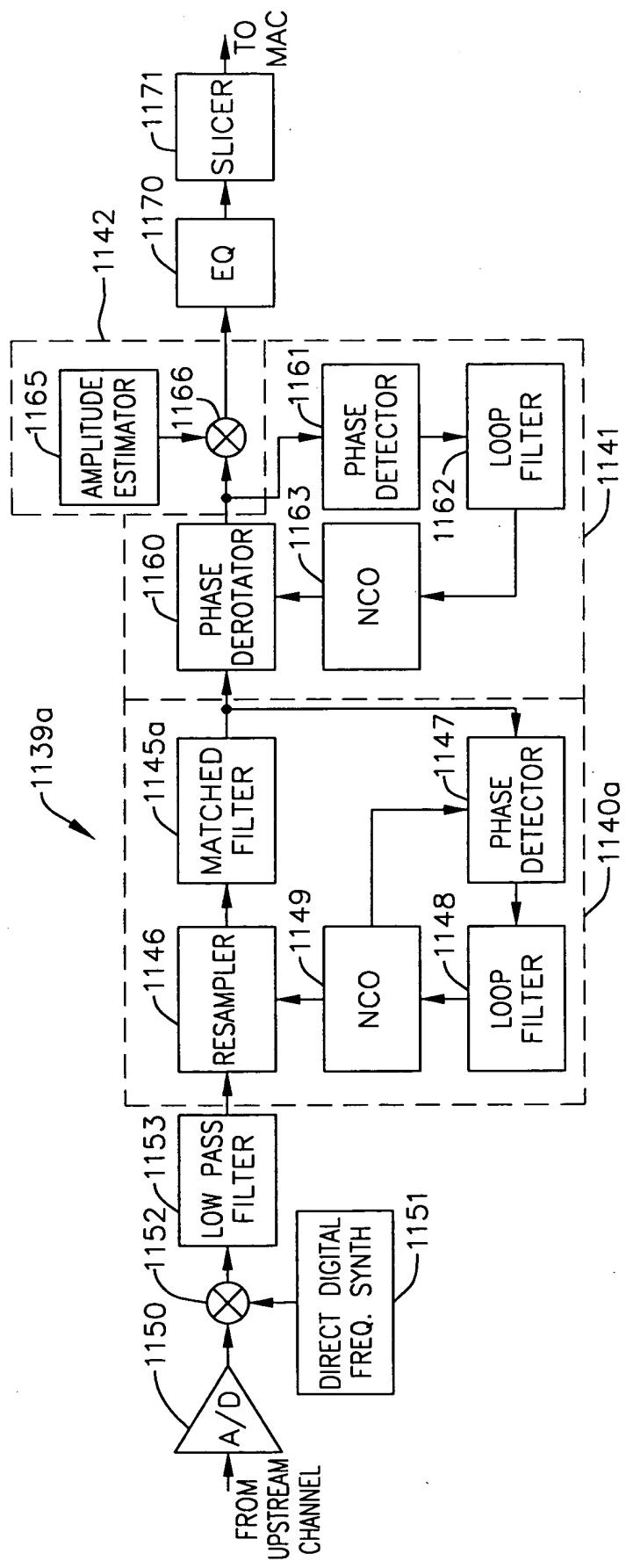


FIG. 22

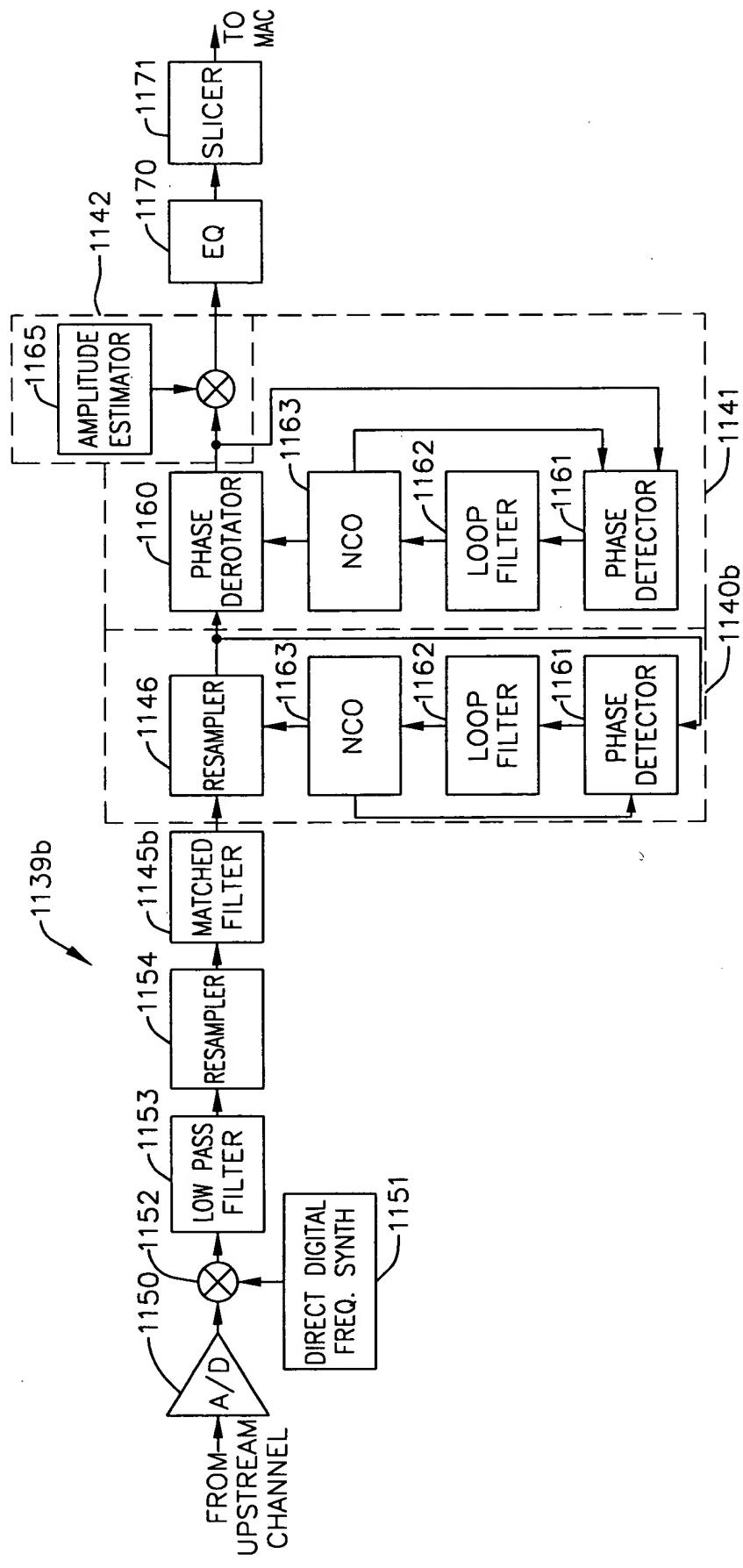


FIG.23

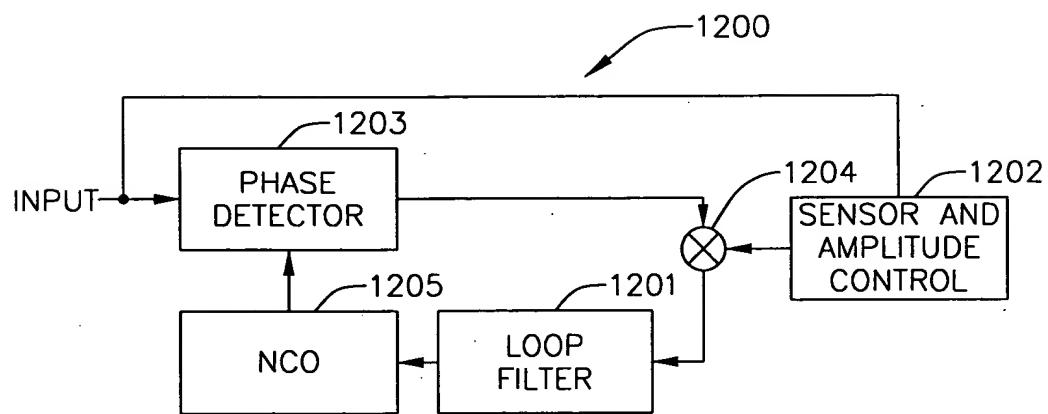
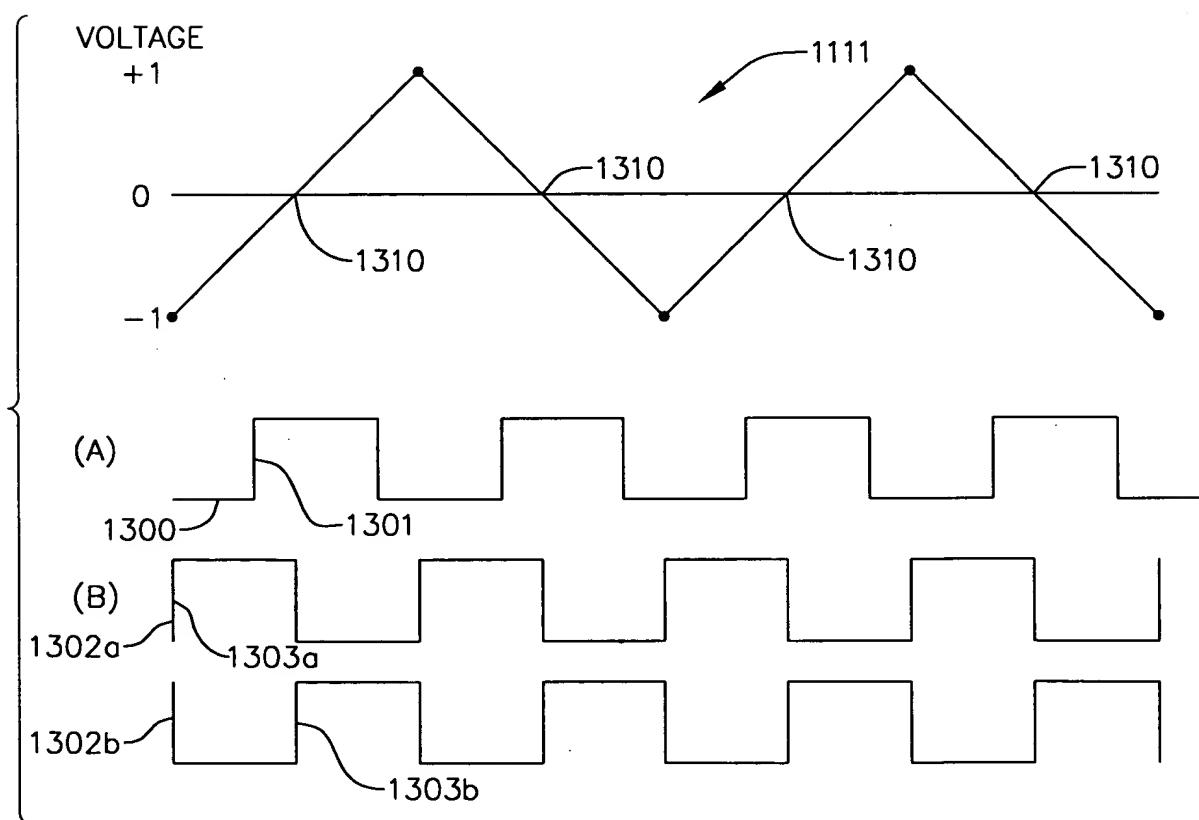
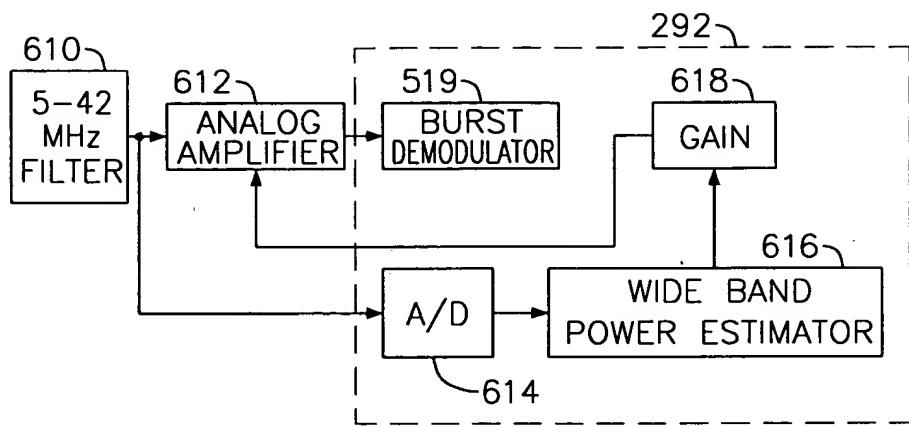


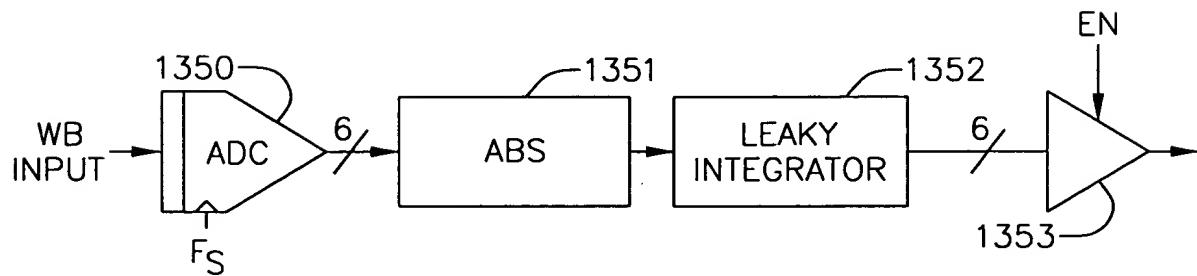
FIG.24



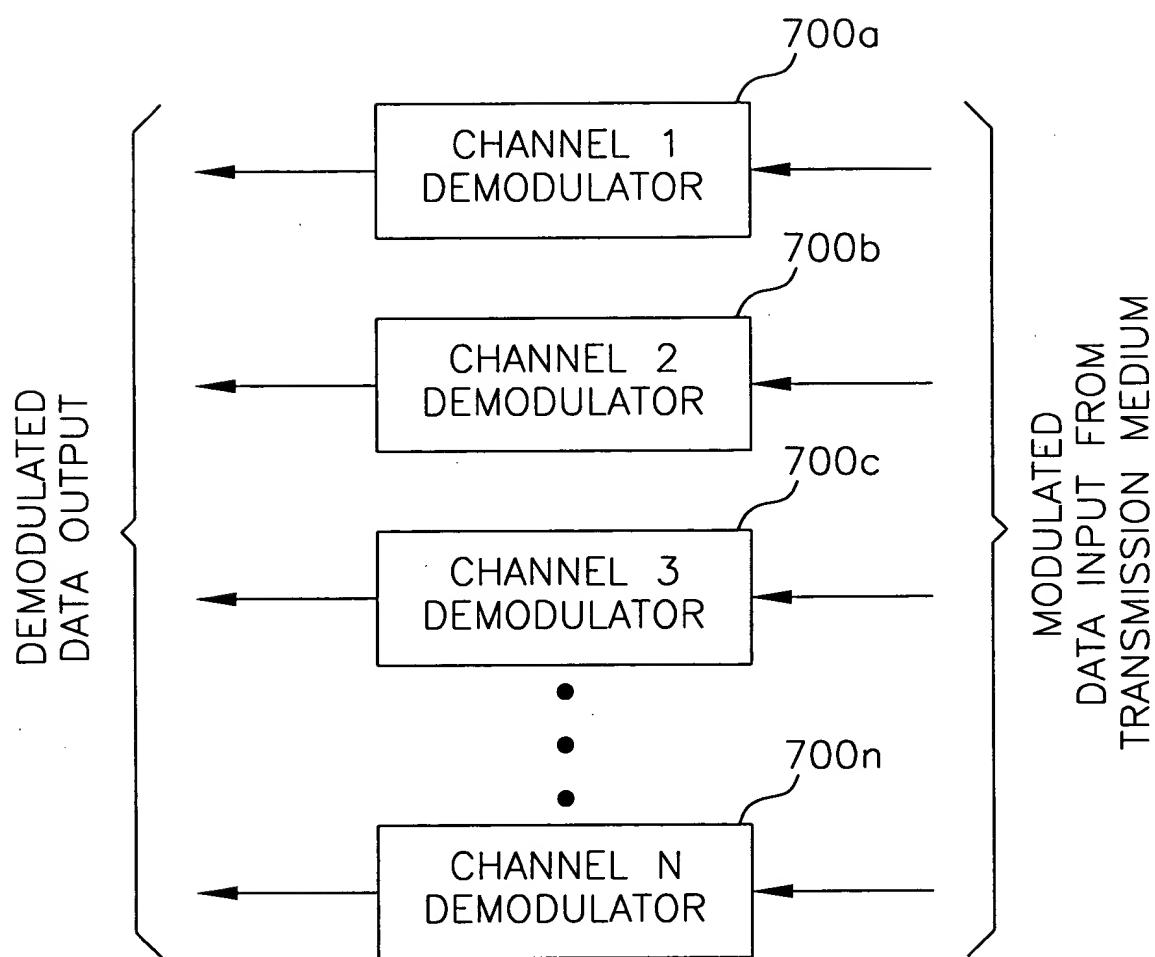
*FIG.25A*



*FIG.25B*

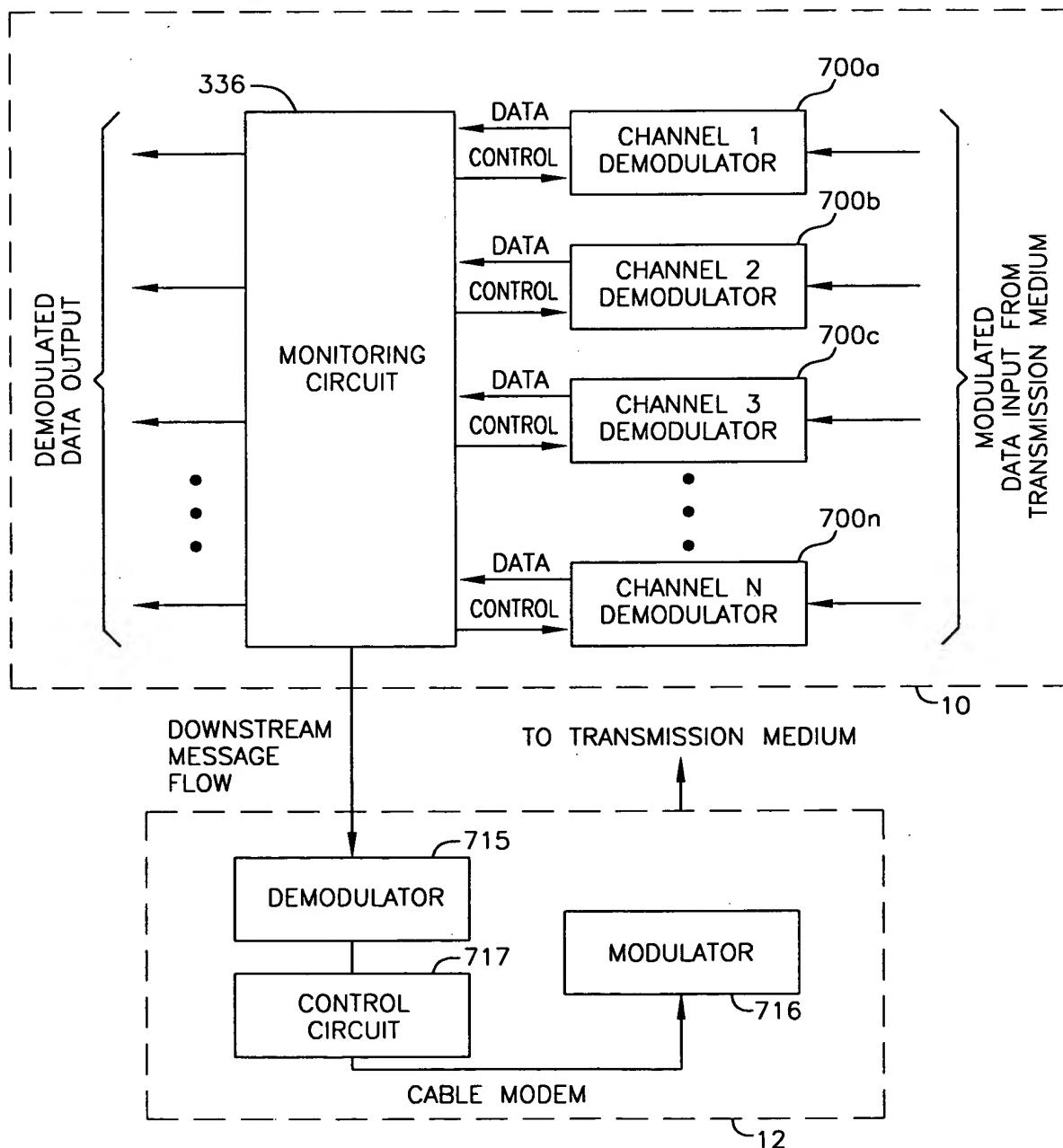


*FIG.26*

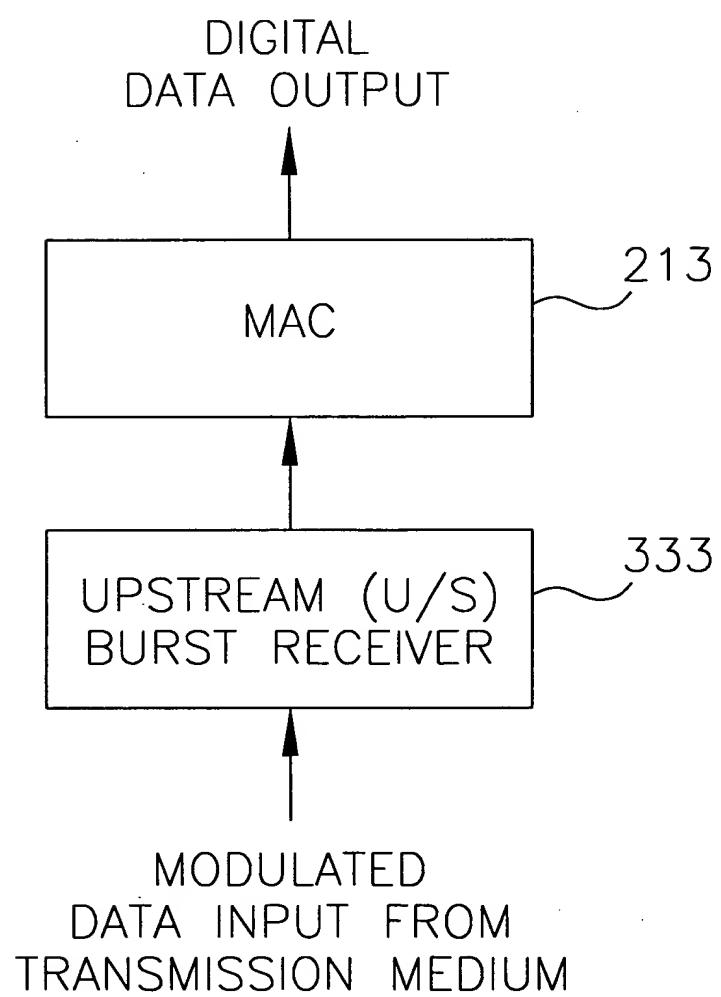


*FIG.27*

CABLE MODEM  
TERMINATION SYSTEM



*FIG.28*



*FIG. 29*

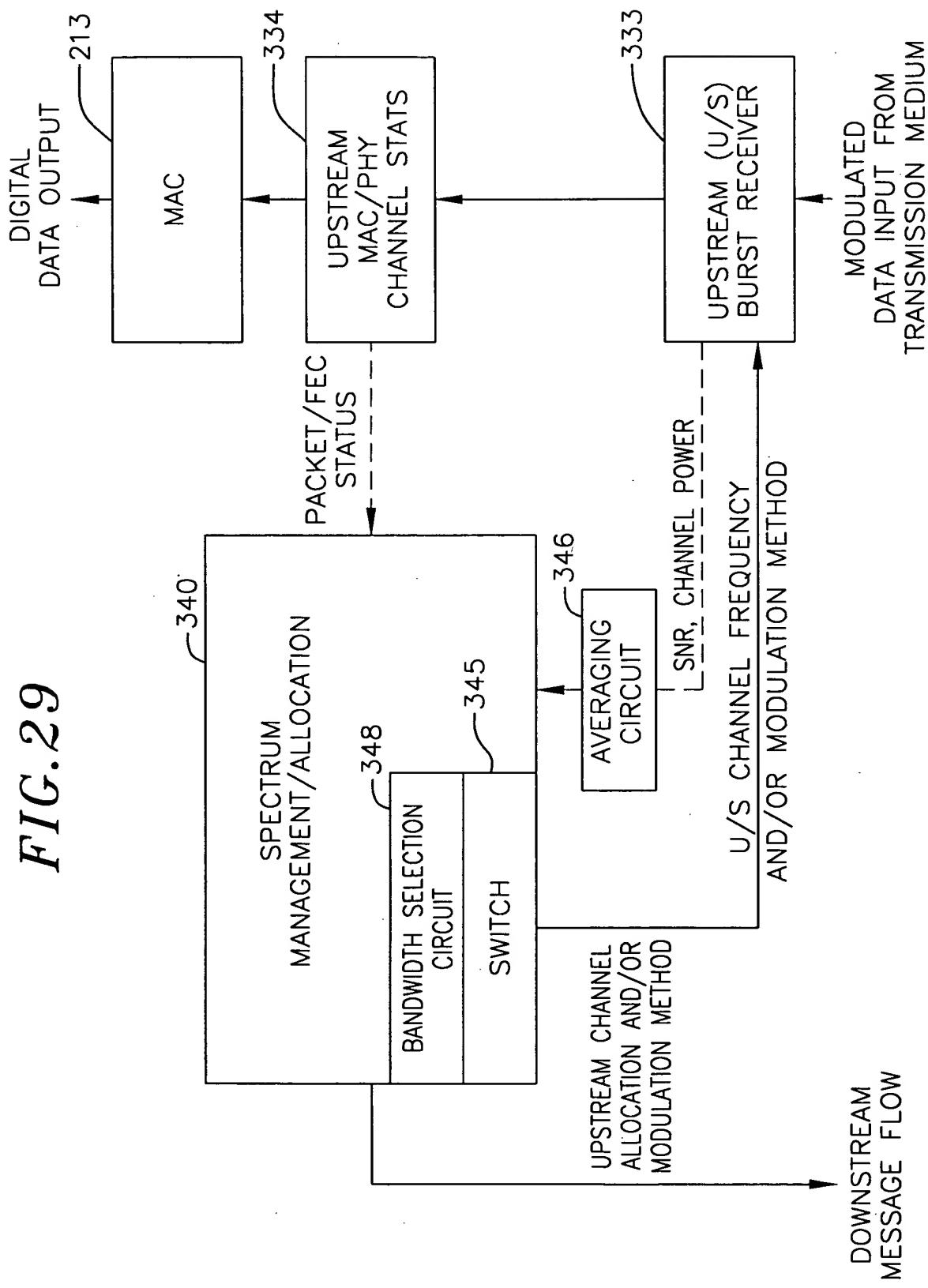


FIG. 30

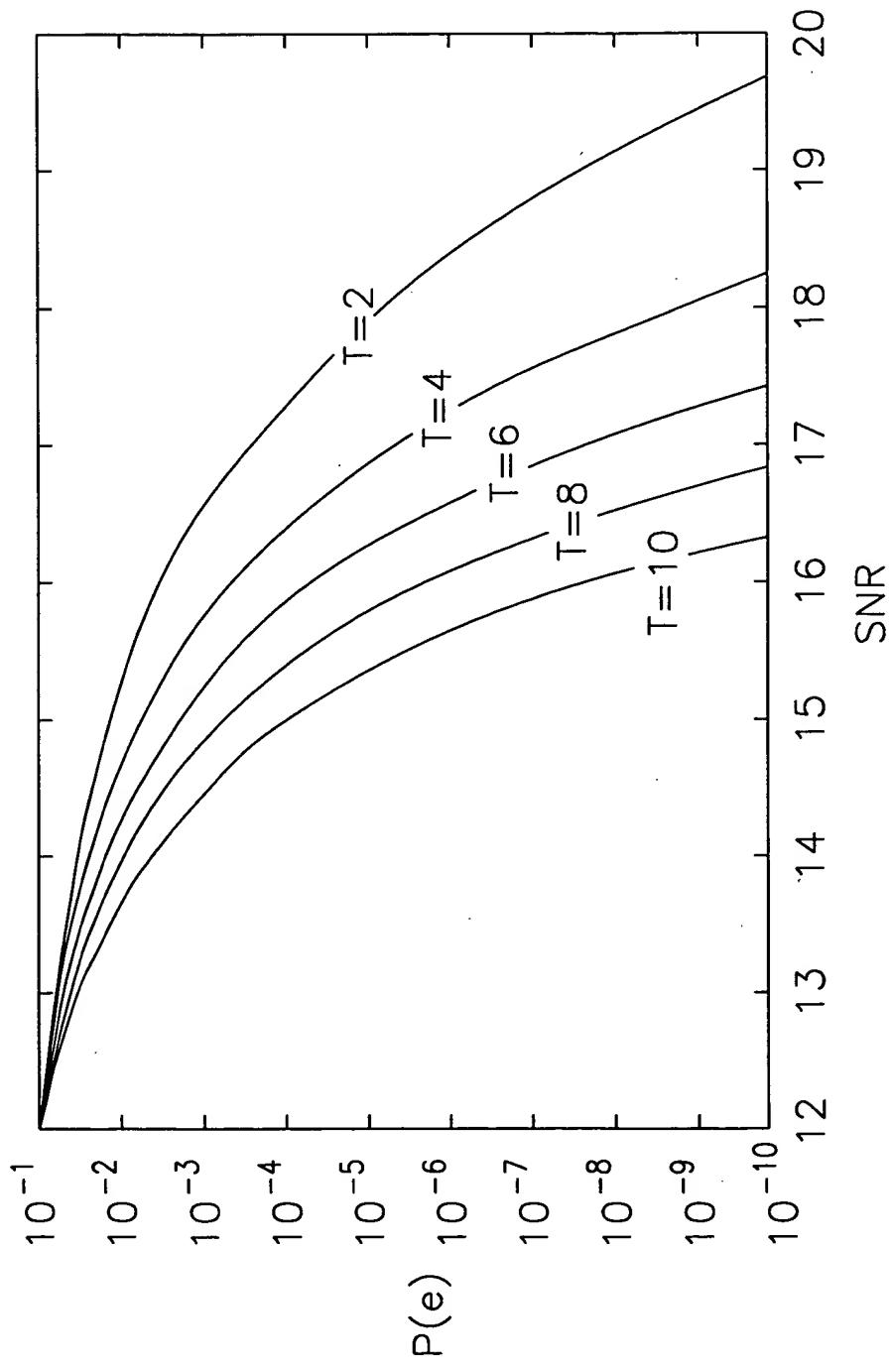
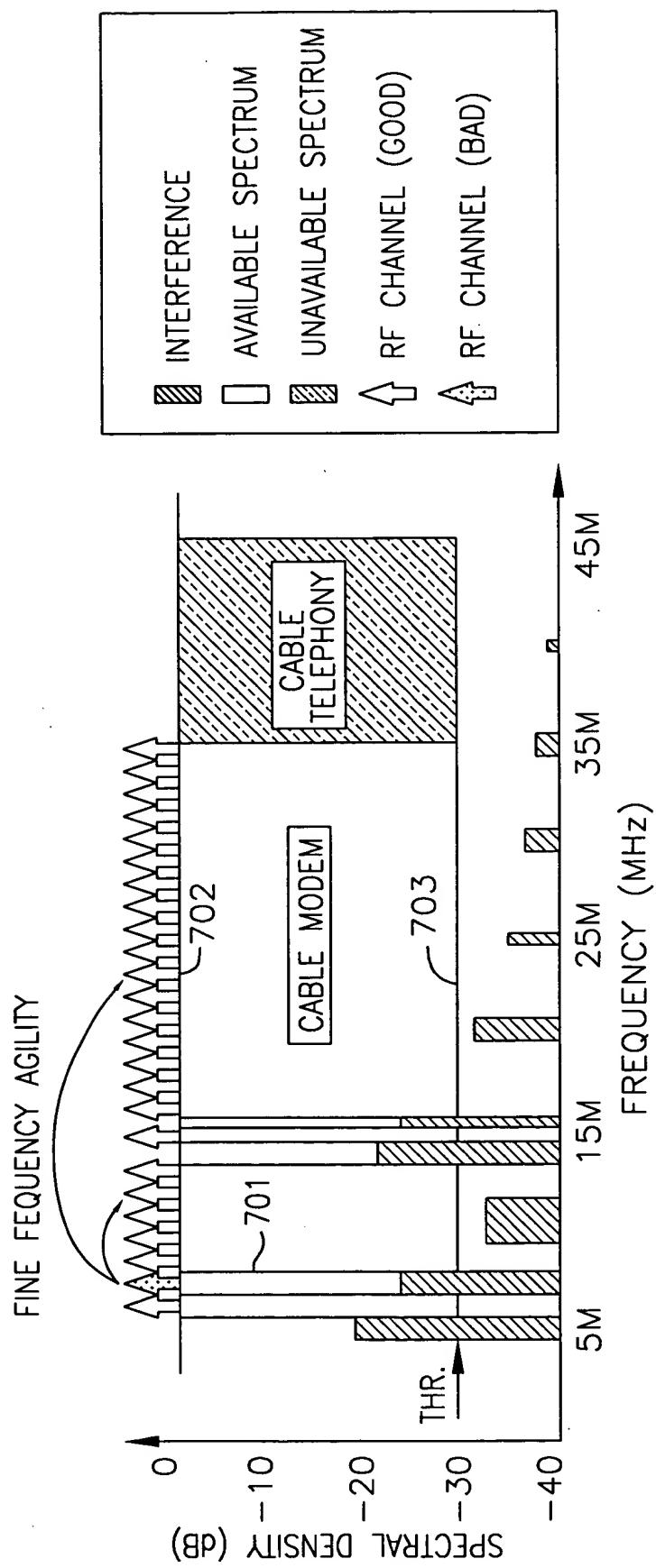
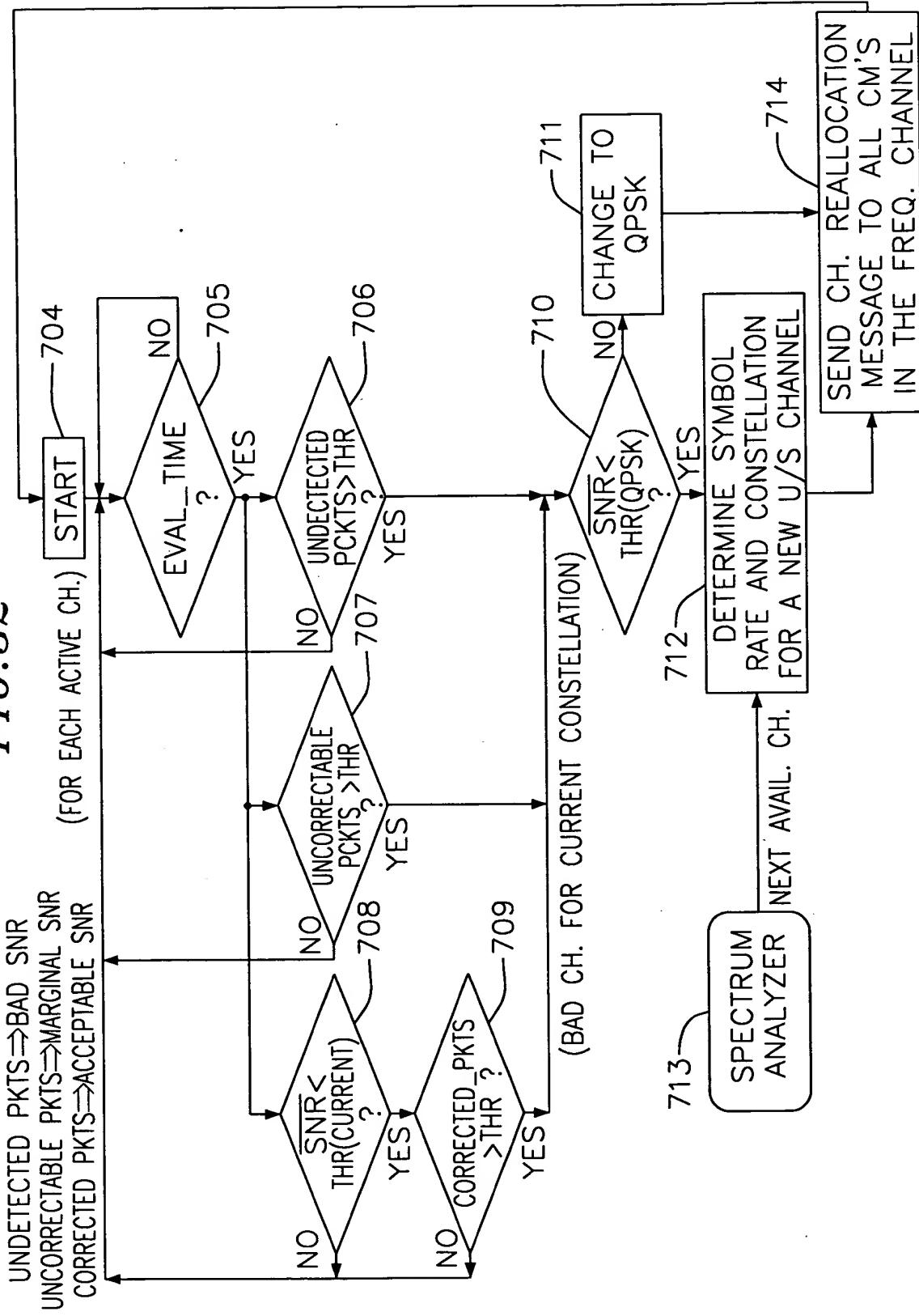


FIG. 31



**FIG. 32**



**FIG. 3.3**

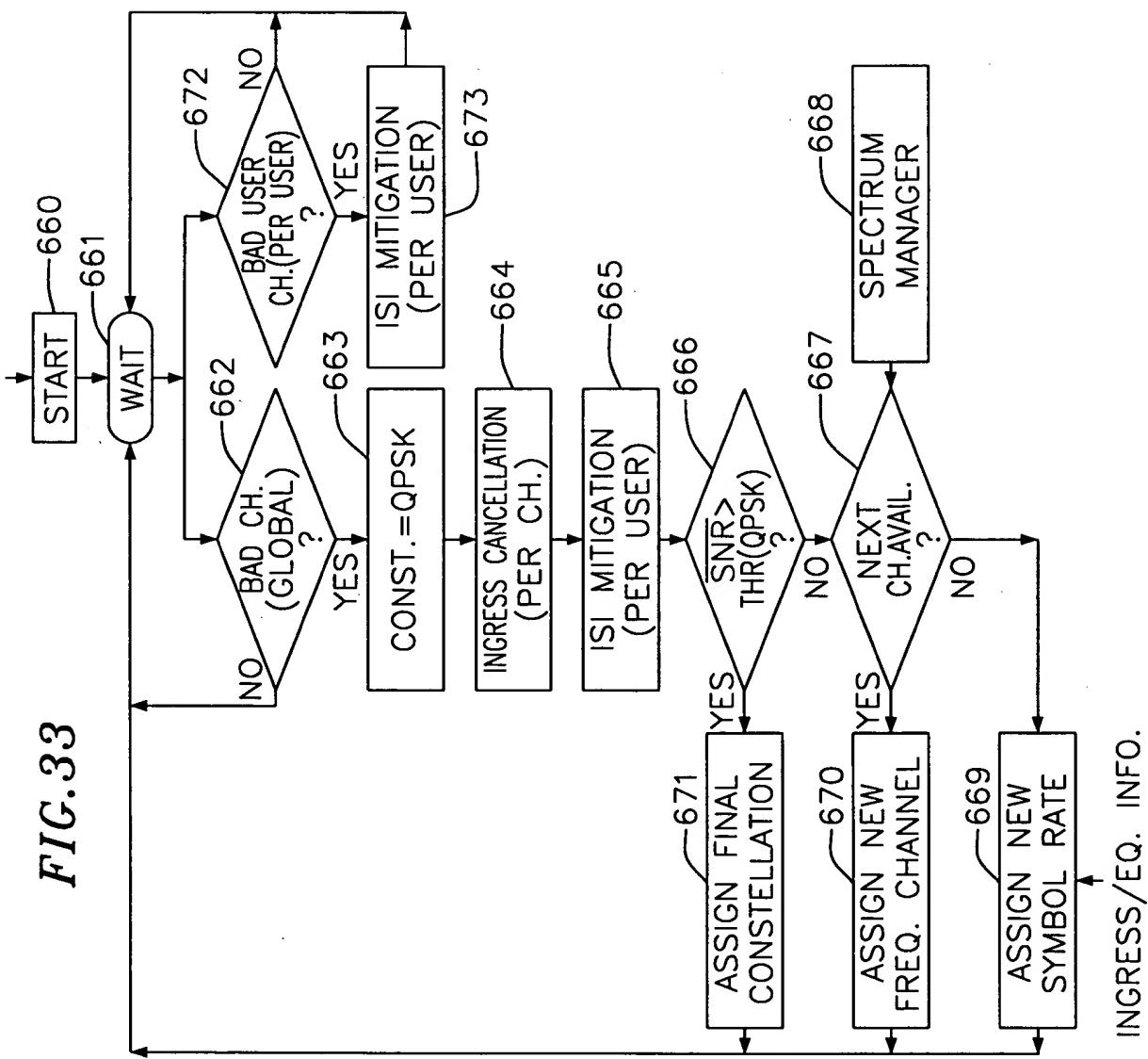


FIG. 34

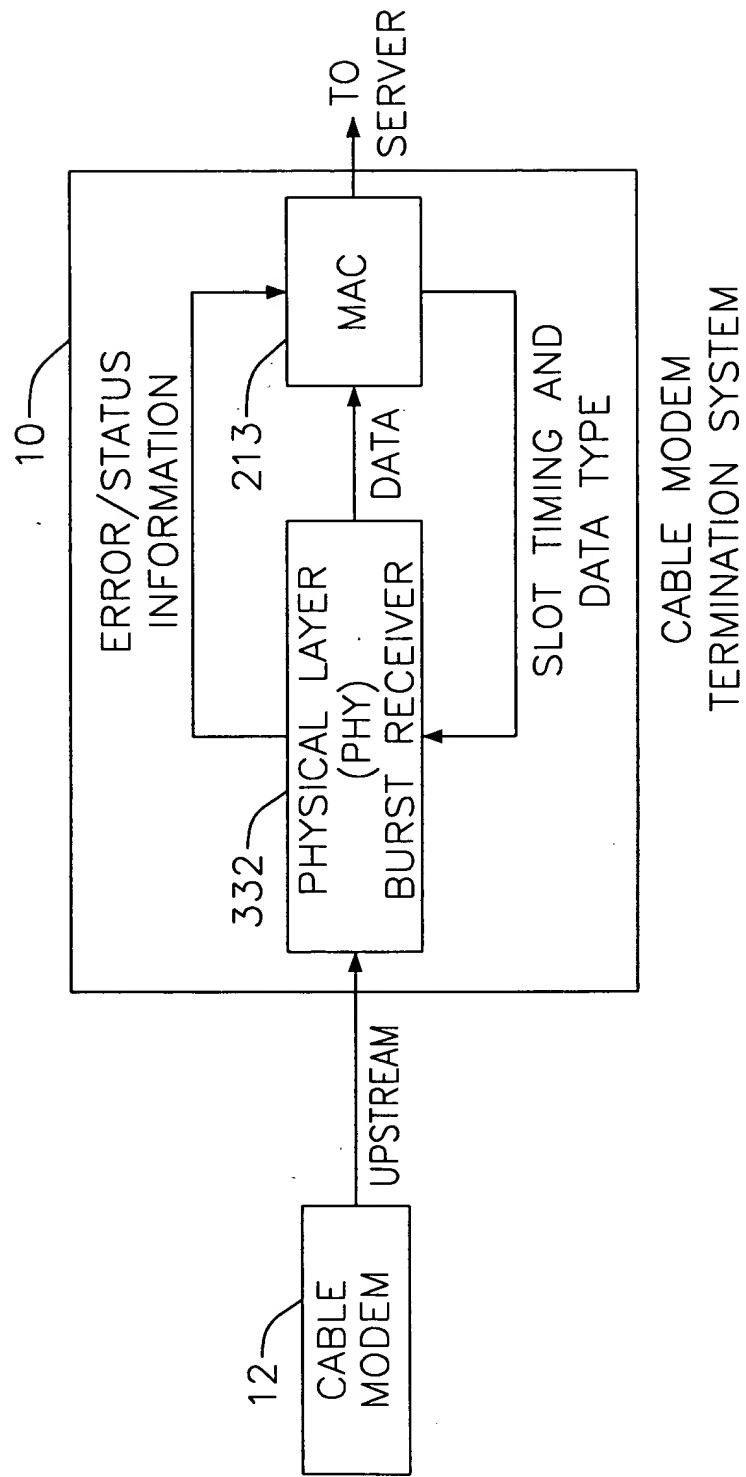


FIG. 35

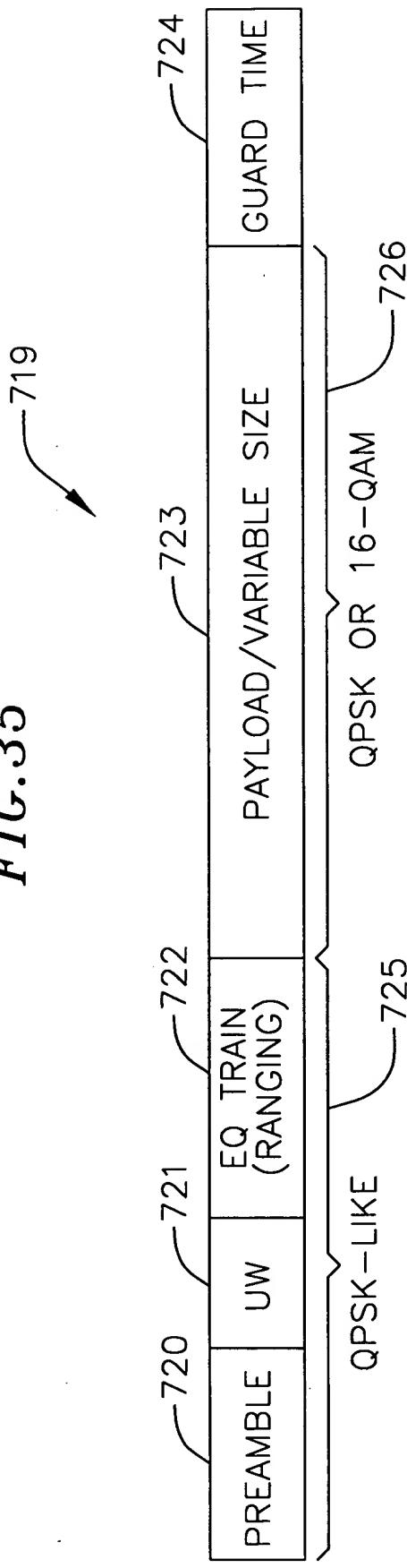


FIG. 36

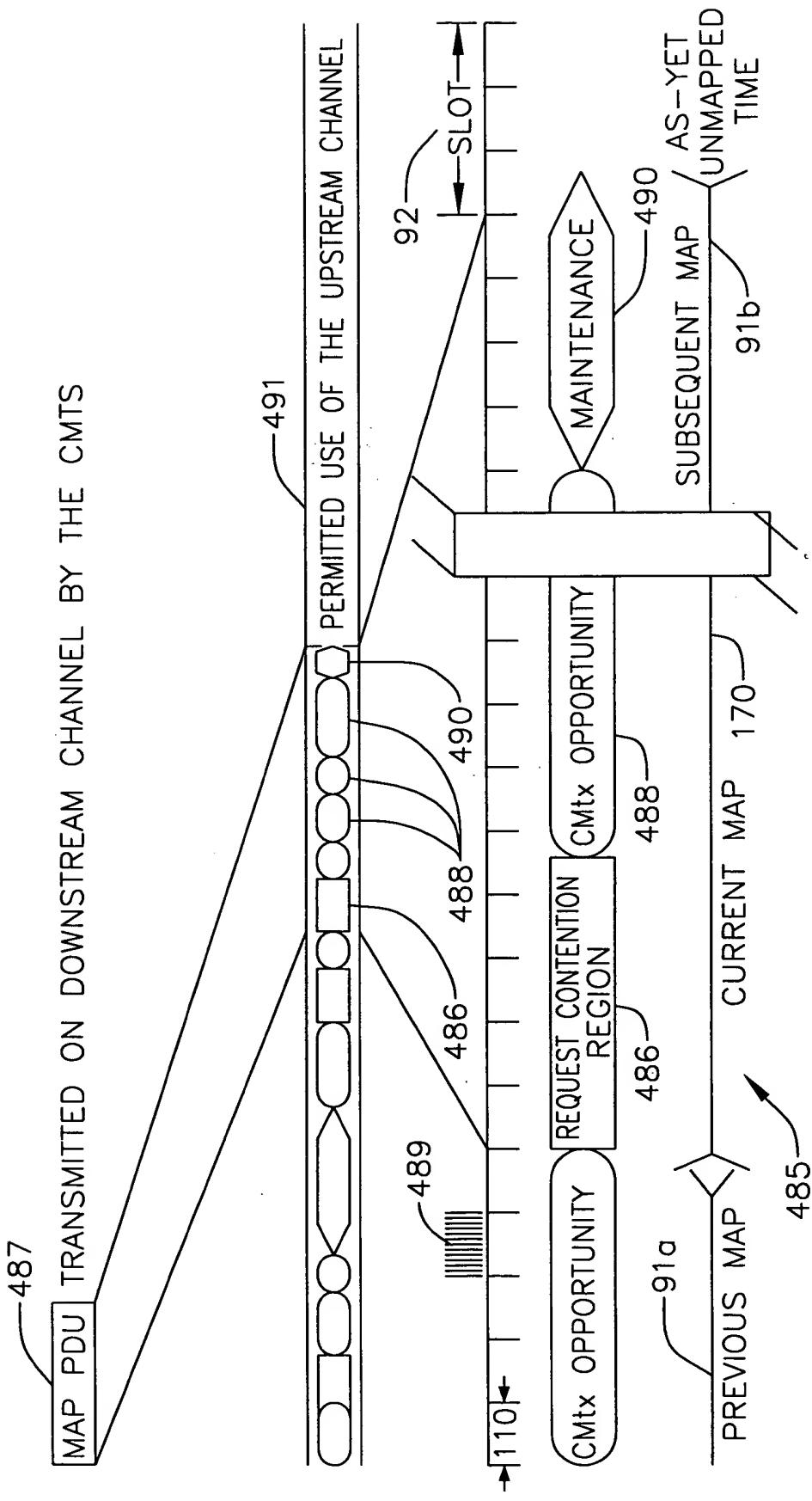


FIG. 37

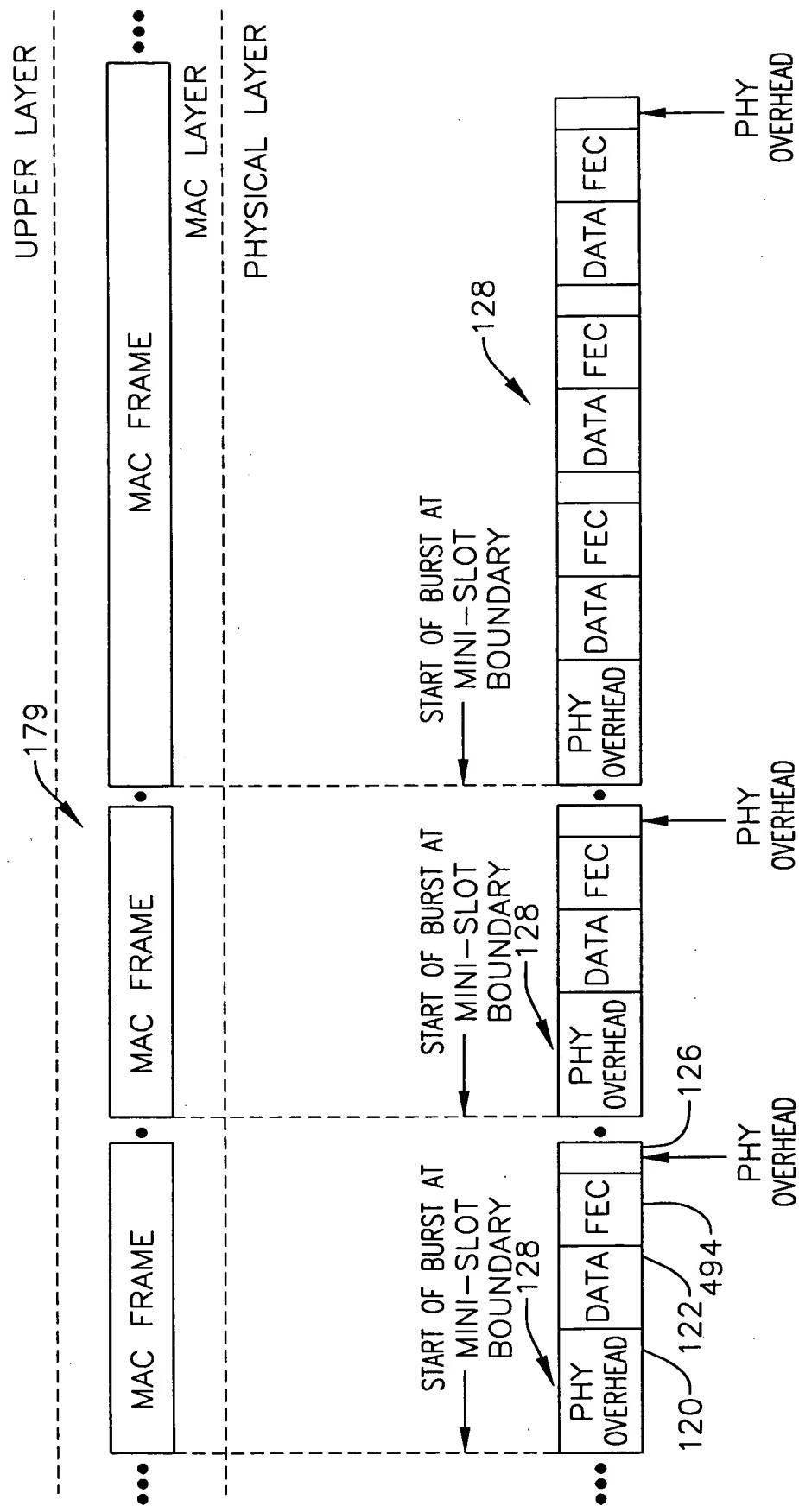


FIG. 38

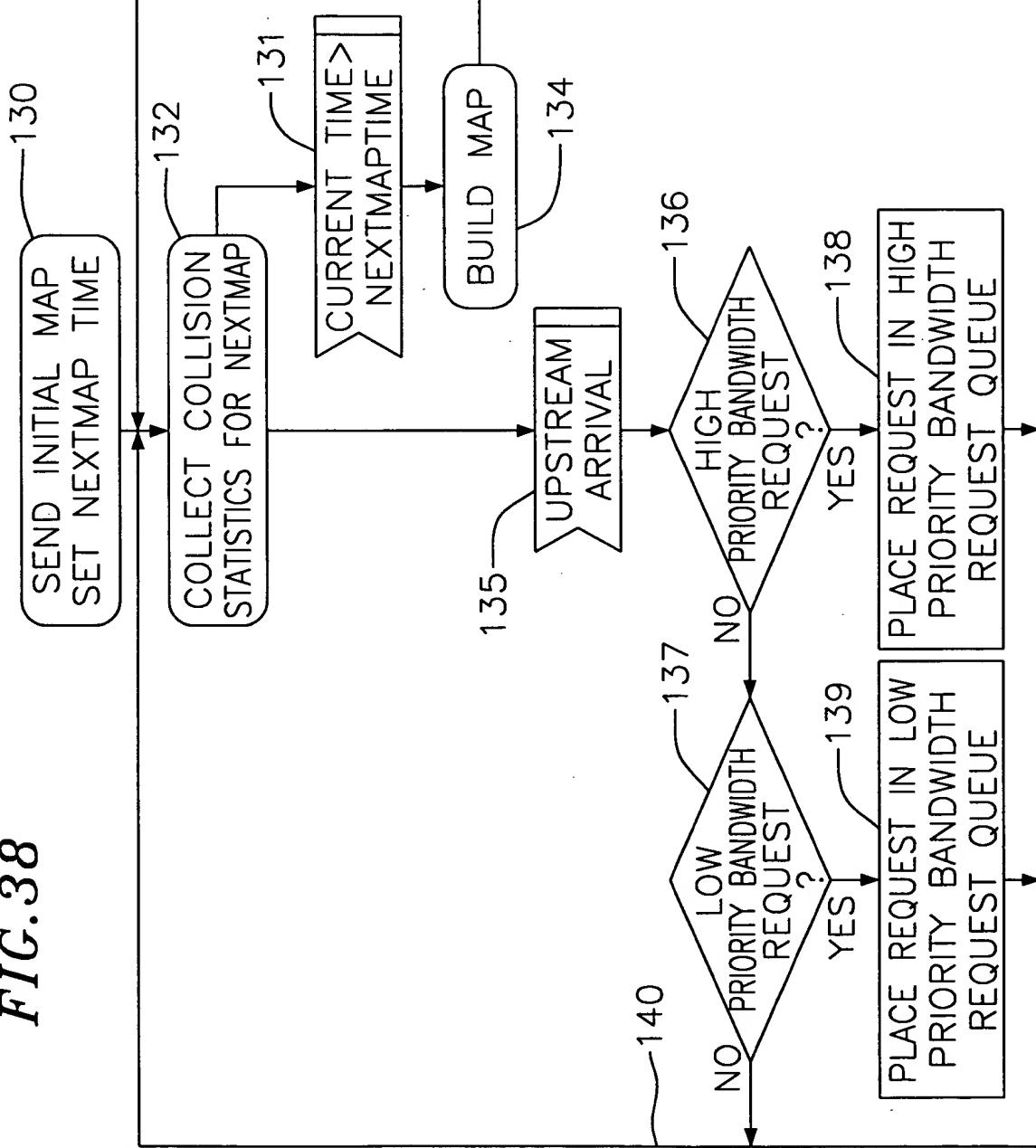


FIG. 39

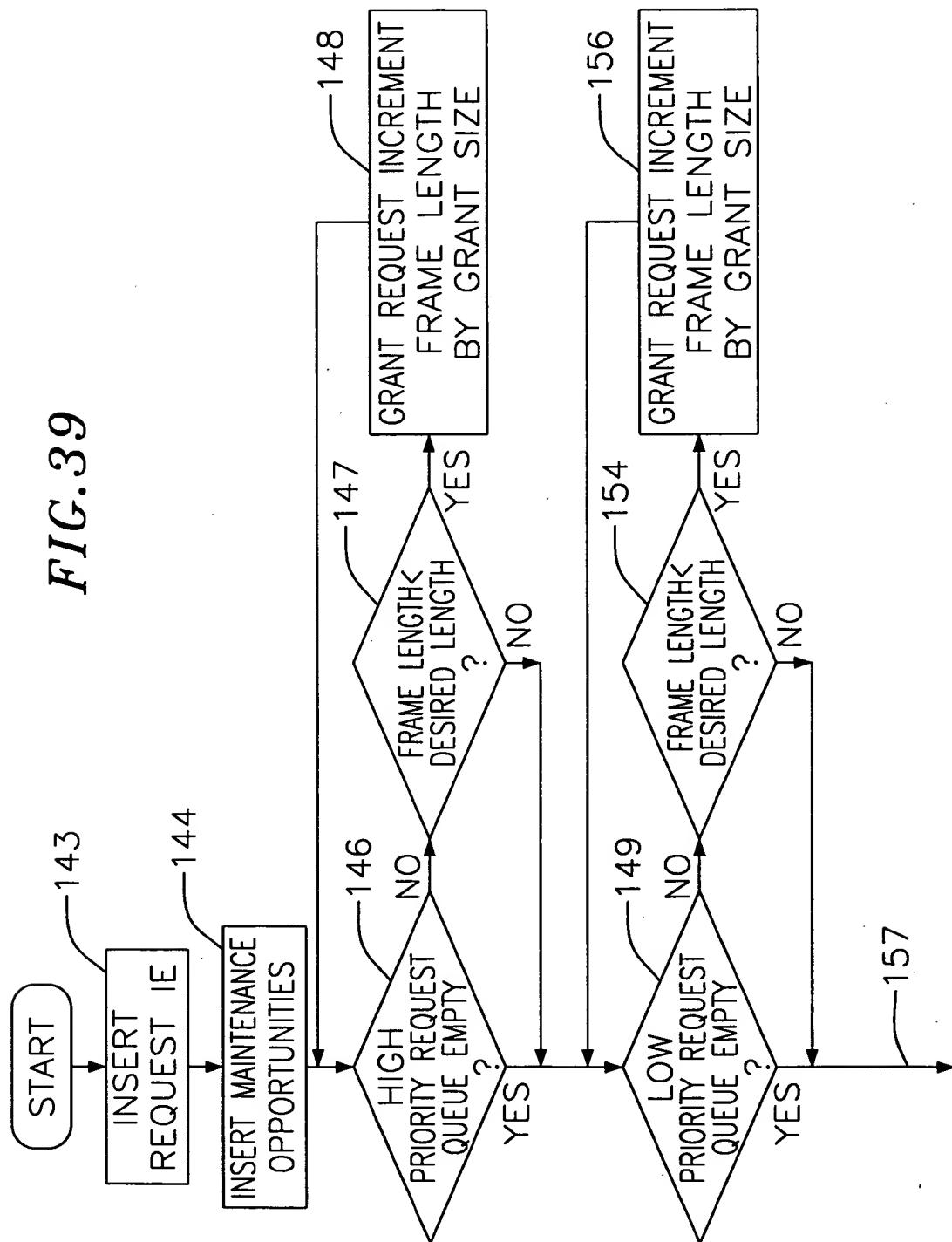
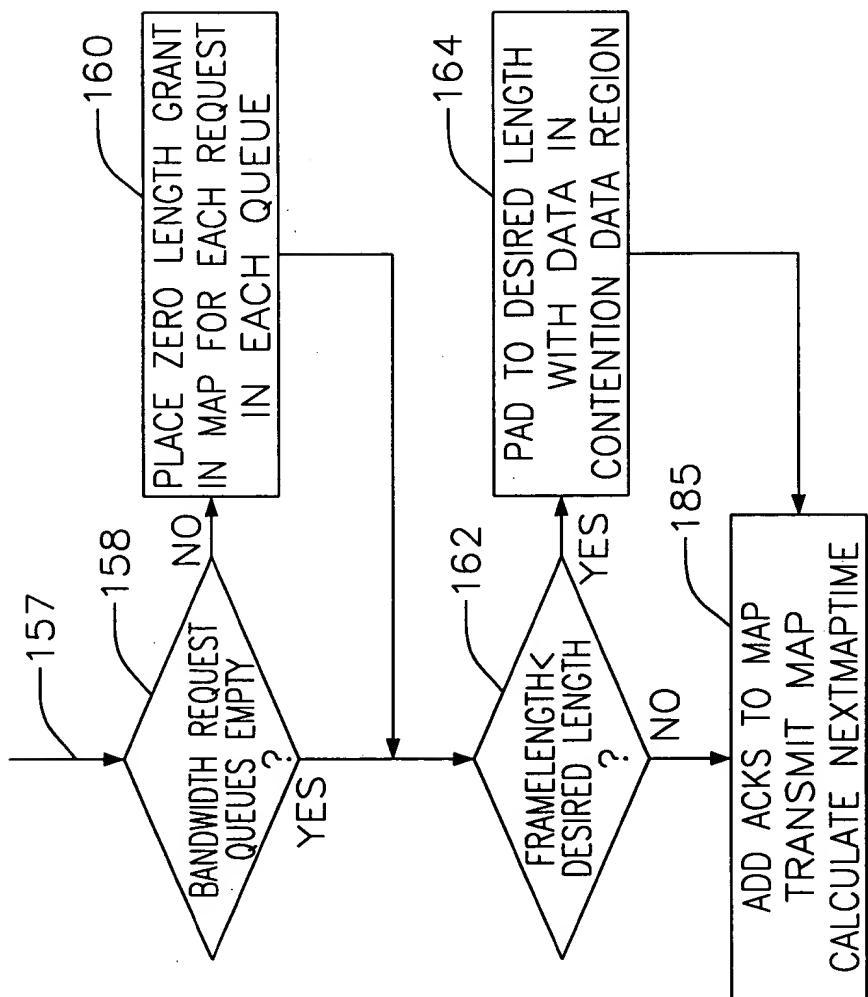
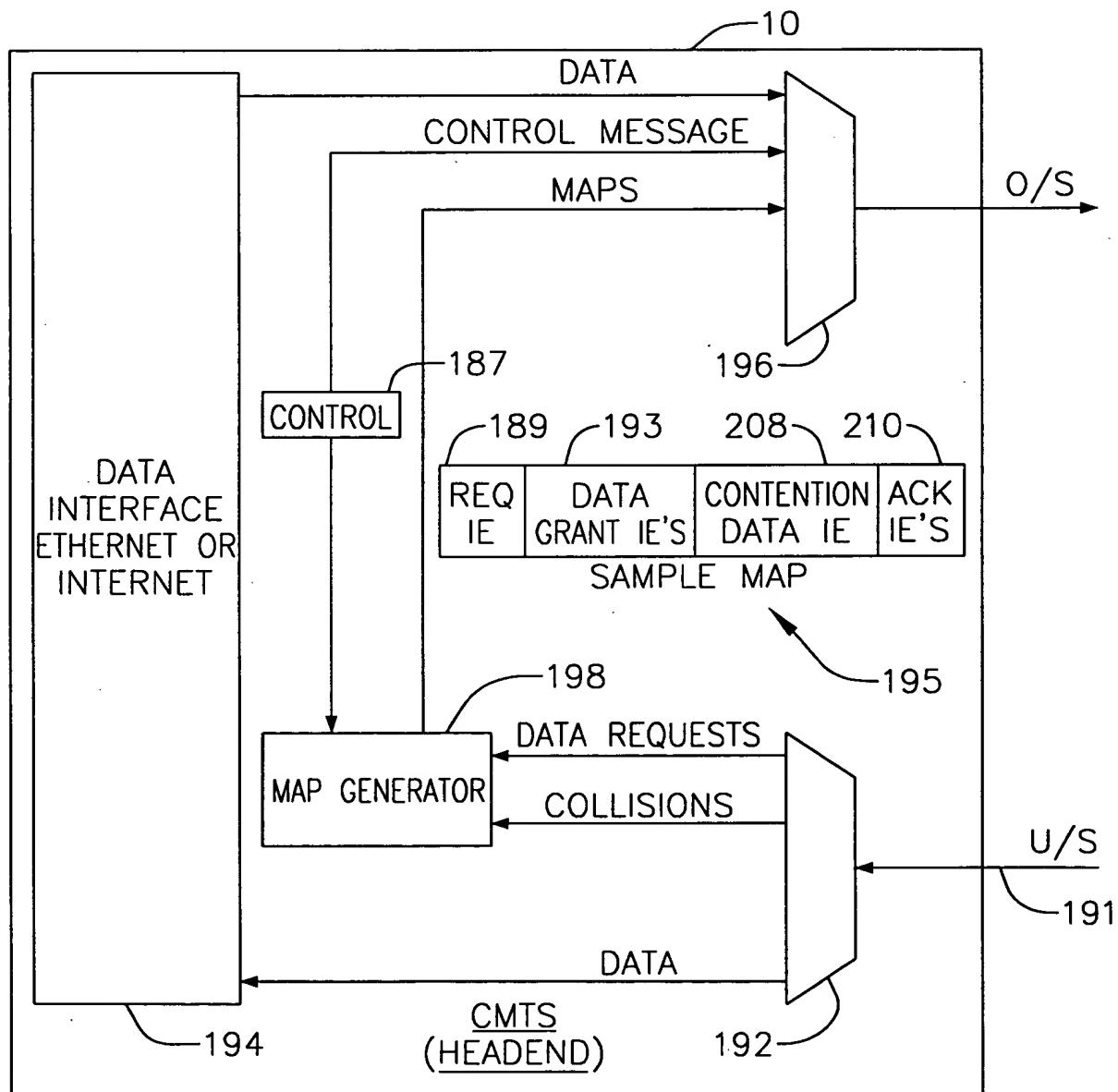


FIG. 40



*FIG.41*

TOP SECRET//COMINT//NOFORN



**FIG. 42**

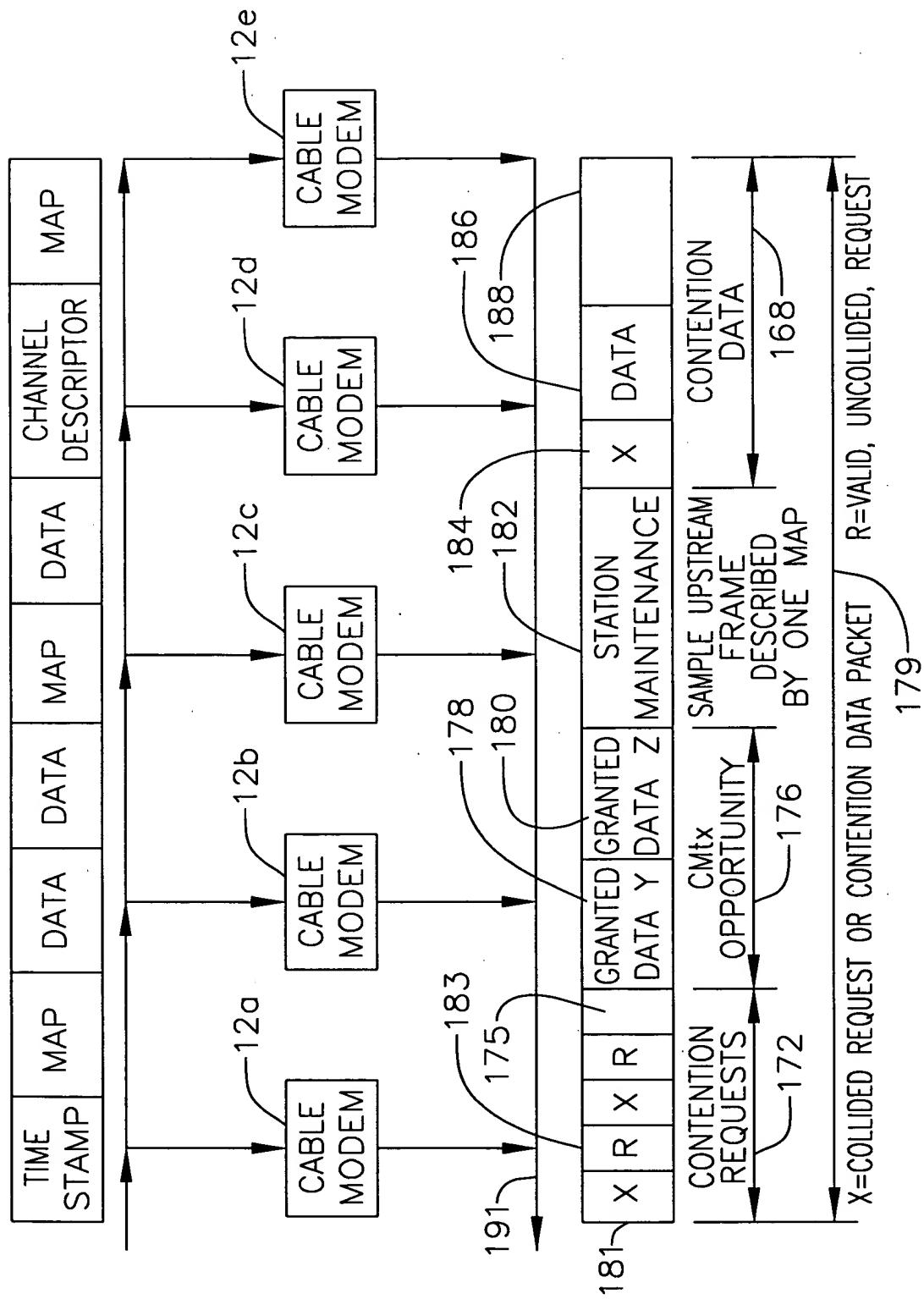
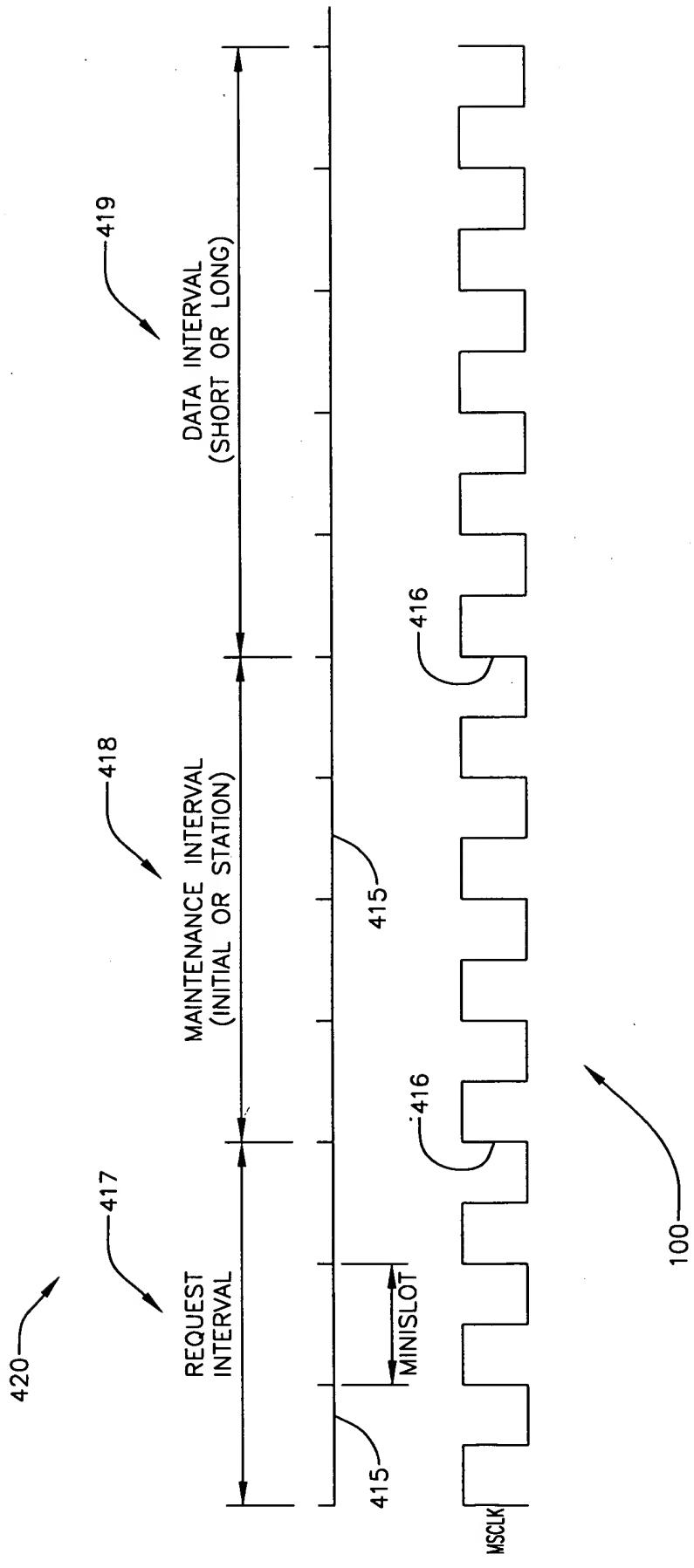


FIG. 43



**FIG. 44**

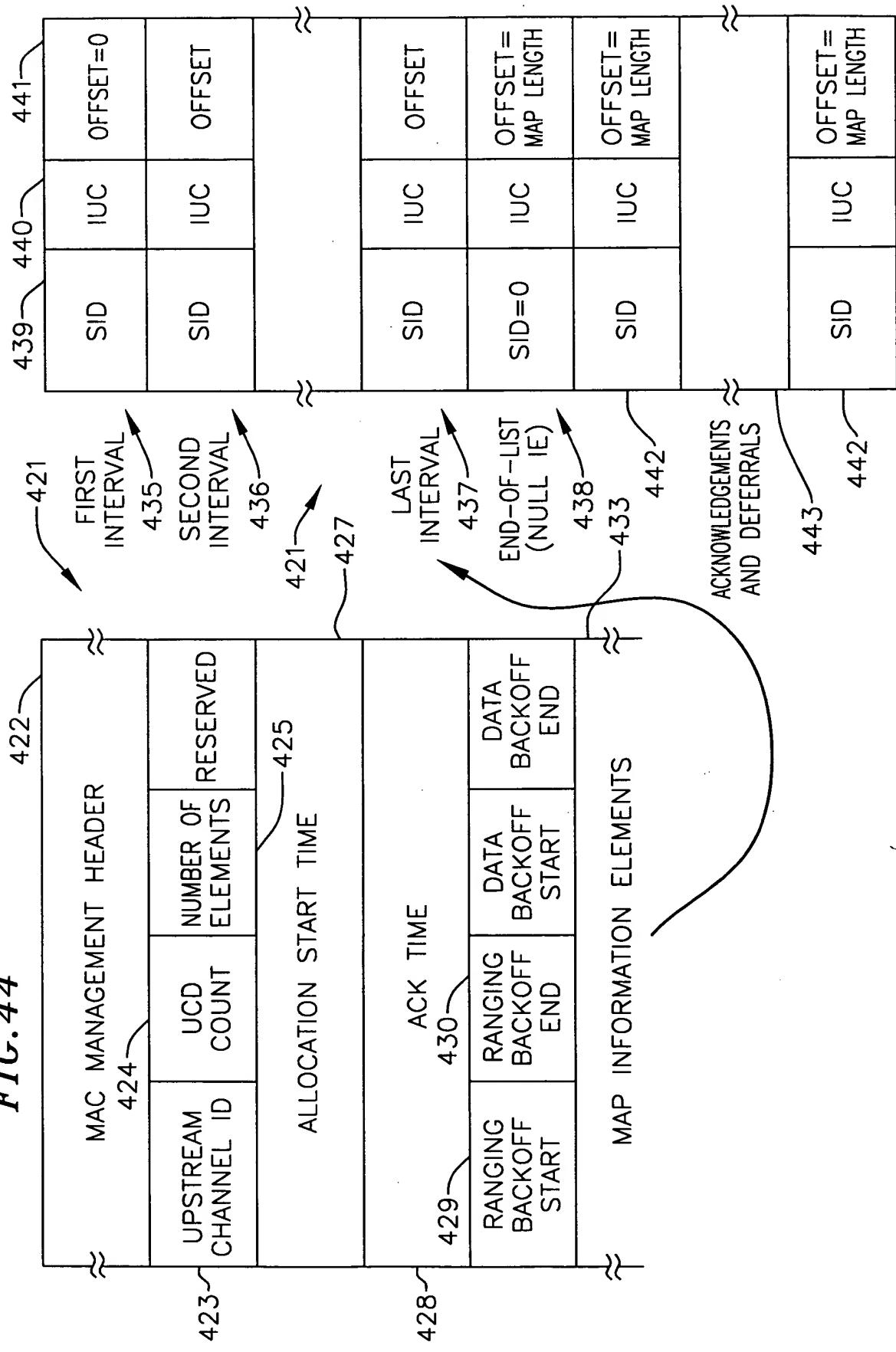


FIG. 45

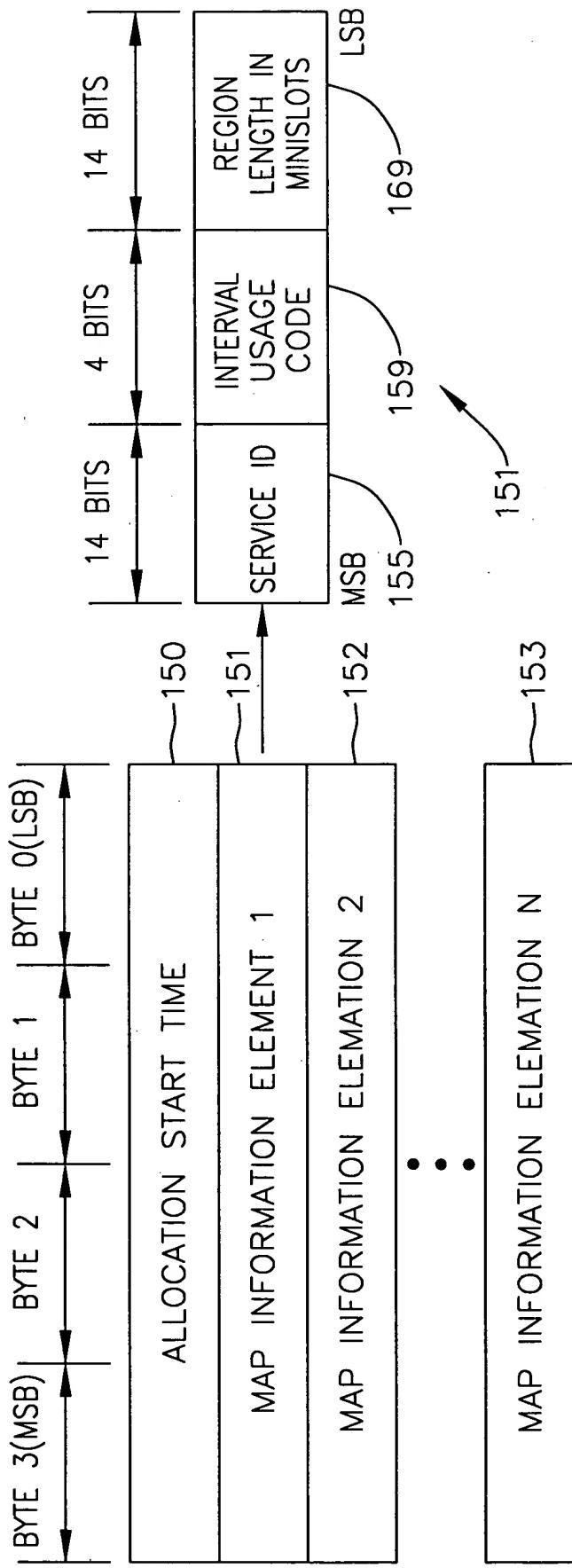


FIG. 46

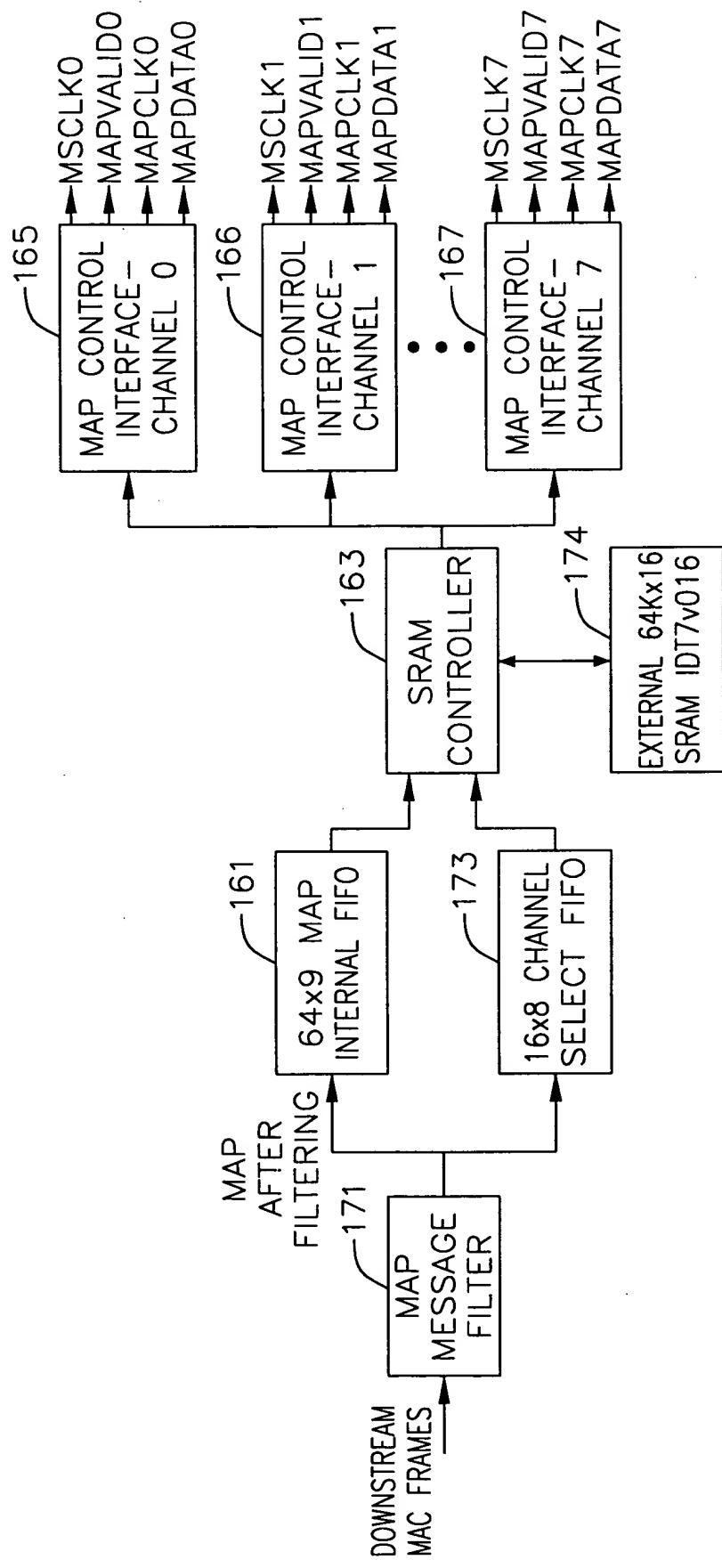


FIG. 47

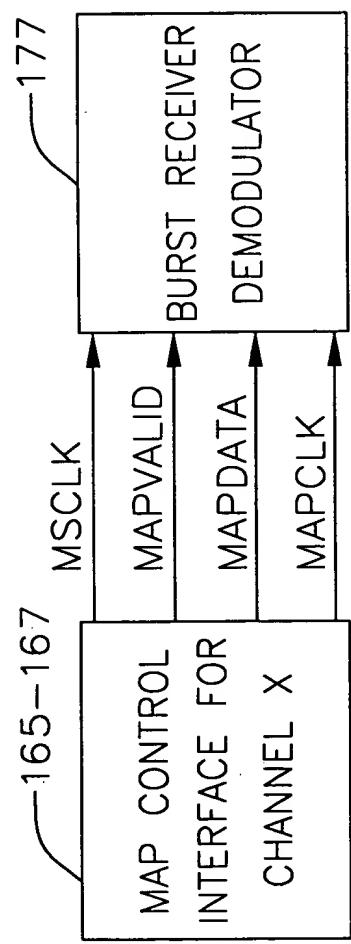


FIG. 48

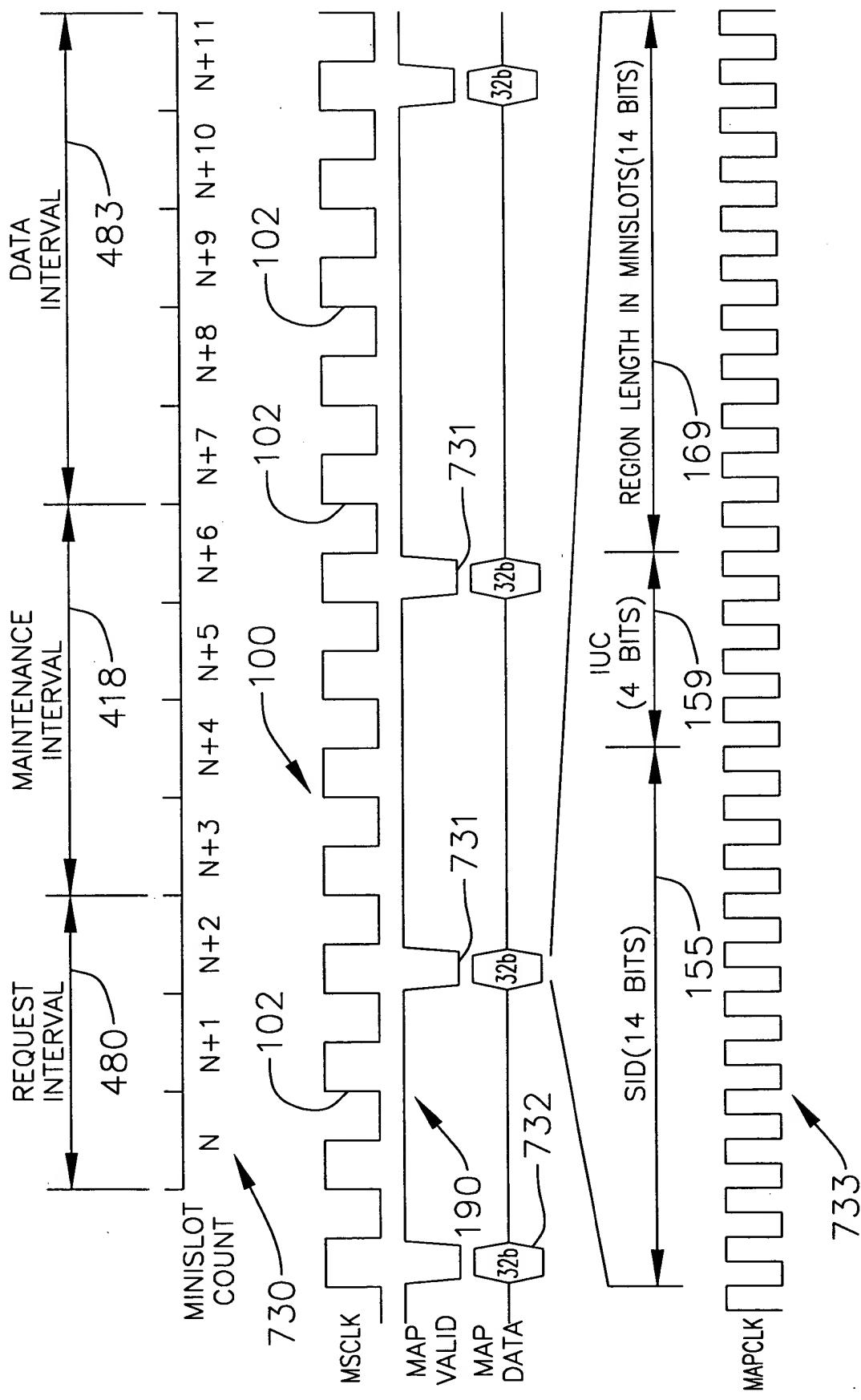


FIG. 49

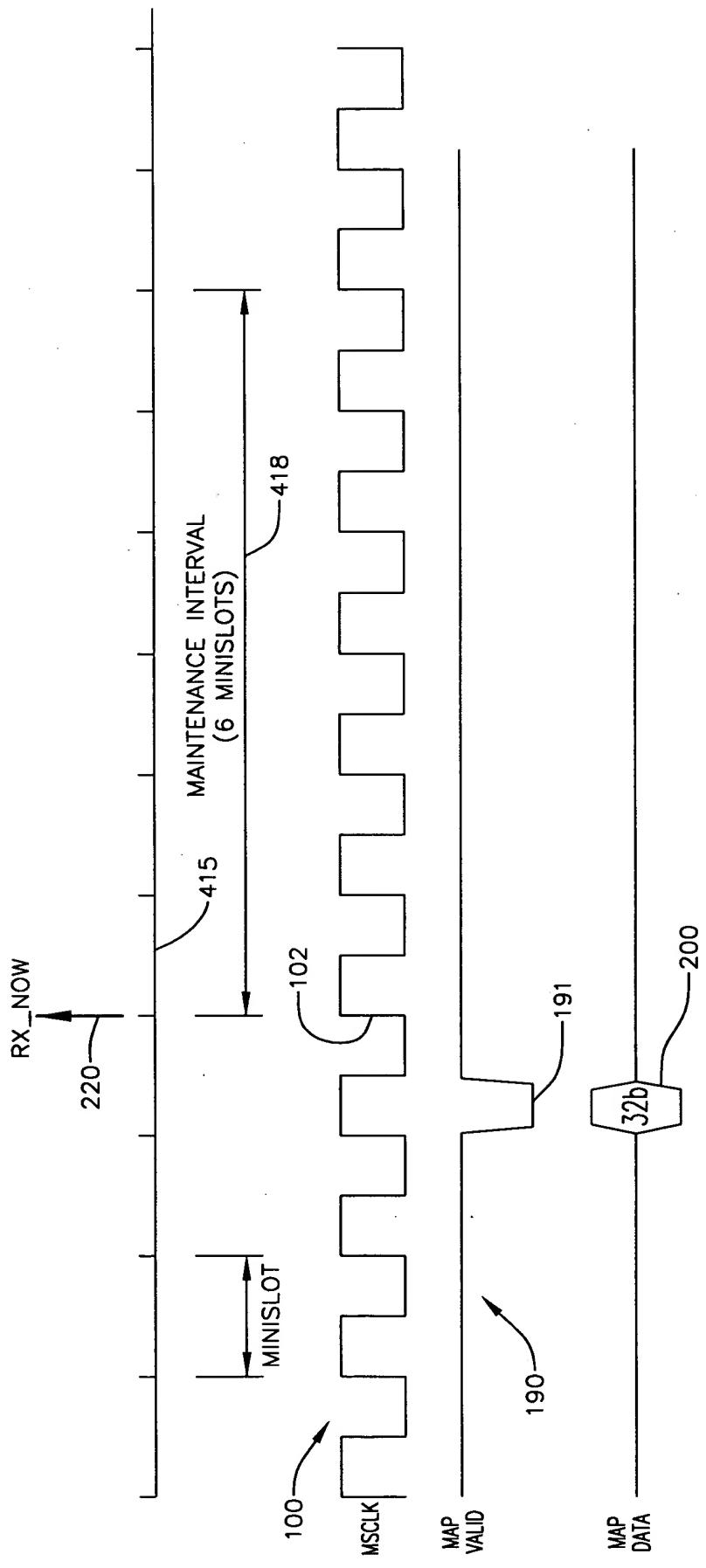


FIG. 50

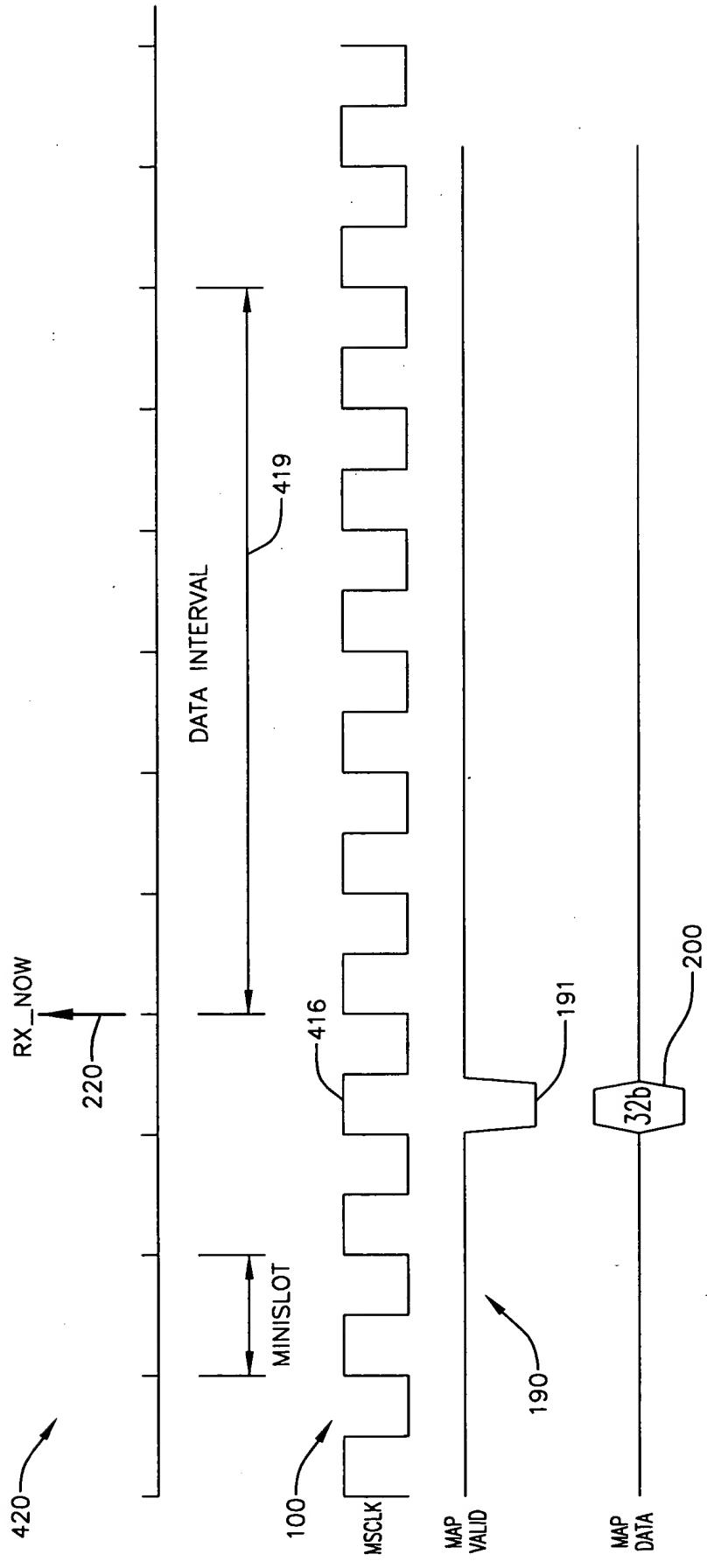
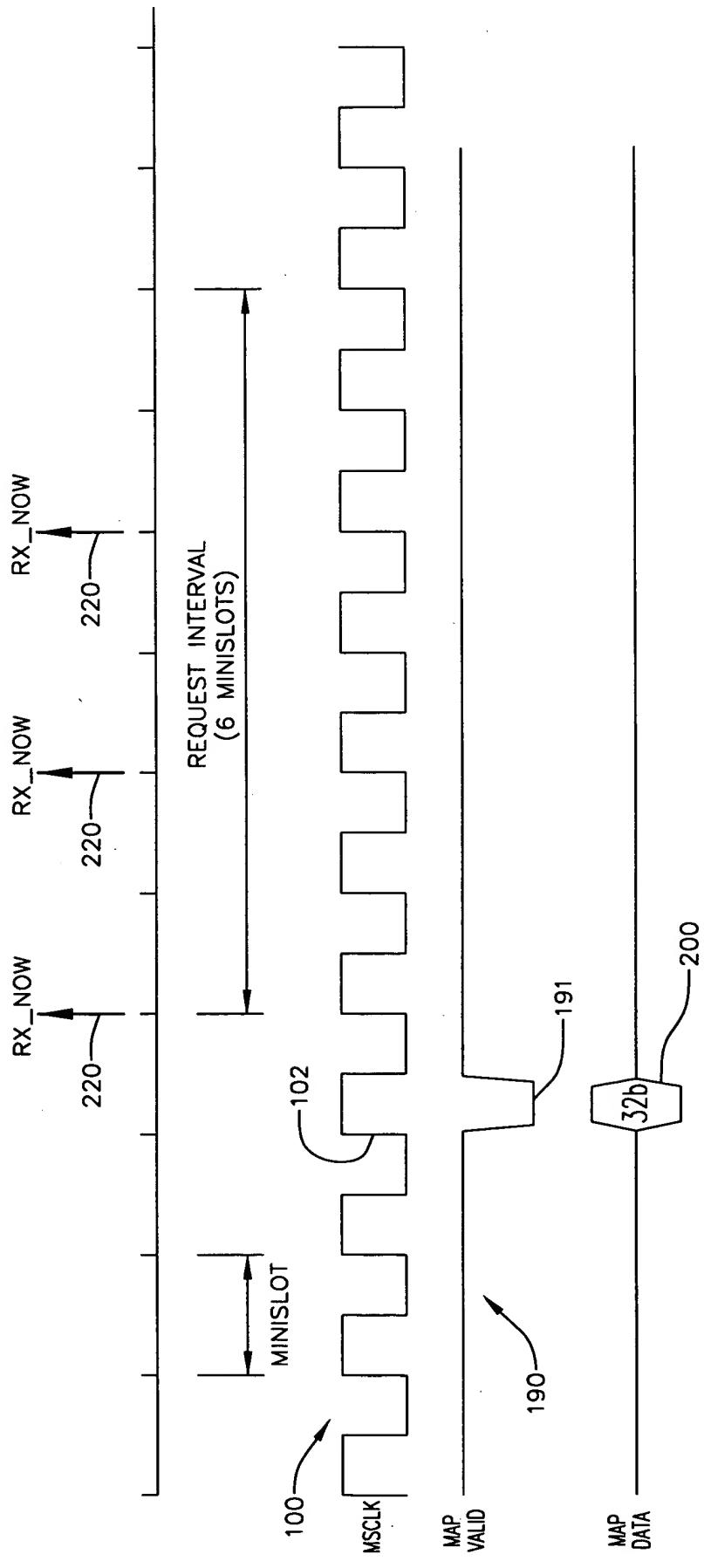


FIG.51



**FIG.52**

RNG. OFFSET 7 BYTES

STATUS 2 BYTES	TIMESTAMP 4 BYTES	CH. ID 1 BYTE	SID 2 BYTES	PWR. 2 BYTES	FREQ. 2 BYTES	TIME 3 BYTES
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**FIG.53**

RNG. OFFSET 7 BYTES

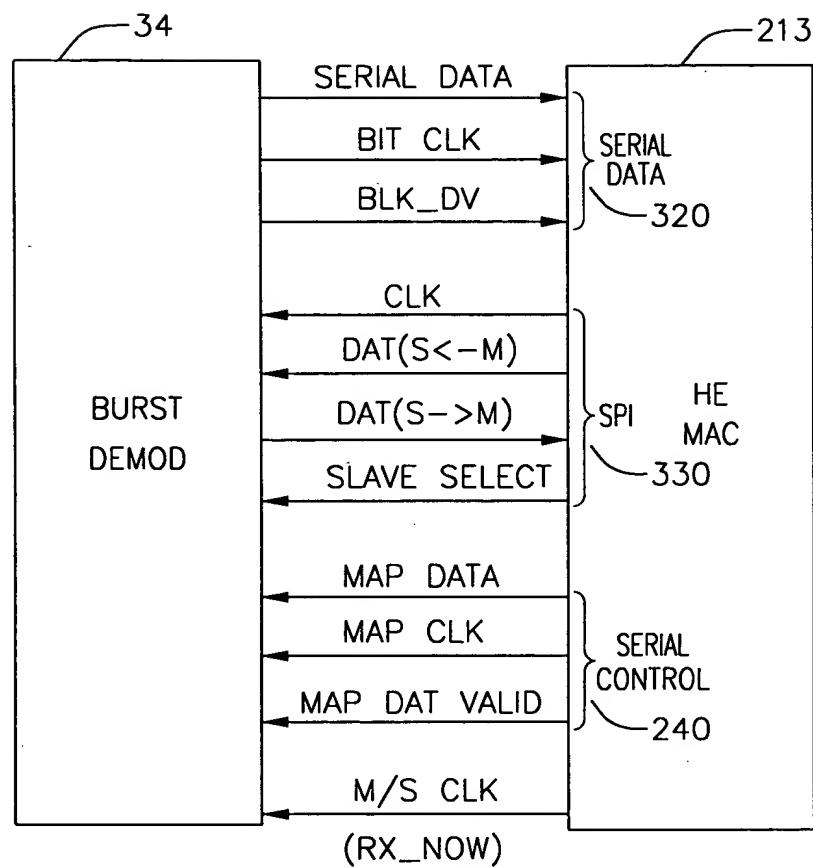
STATUS 2 BYTES	TIMESTAMP 4 BYTES	CH. ID 1 BYTE	SID 2 BYTES	PWR. 2 BYTES	FREQ. 2 BYTES	TIME 3 BYTES	EQUALIZER COEFFS. 32 BYTES
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**FIG.54**

BASED ON THE STATUS BYTES[7:5] BITS, THE FOLLOWING STATISTICS ARE KEPT USING COUNTERS.

SLOT DEFINITION	STATISTICS	CALCULATION
DATA	1.NUMBER OF SLOTS 2.NUMBER OF SLOTS WITH POWER BUT NO DATA 3.NUMBER OF SLOTS WITH BAD DATA 4.NUMBER OF GOOD DATA-SLOTS 5.TOTAL NUMBER OF FEC BLOCKS 6.NUMBER OF FEC BLOCKS WITH CORRECTABLE ERRORS. 7.NUMBER OF UNCORRECTABLE FEC BLOCKS	NO UW UW AND (BAD FEC OR BAD HEC) UW AND GOOD HEC
REQUEST(CONTENTION)	1.NUMBER OF REQUESTS RECEIVED 2.NUMBER OF COLLIDED REQUESTS 3.NUMBER OF CORRUPTED REQUESTS	NO UW NO UW OR BAD FEC OR BAD HEC
REQUEST/DATA (CONTENTION)	1.NUMBER OF PACKETS RECEIVED 2.NUMBER OF COLLIDED PACKETS 3.NUMBER OF CORRUPTED PACKETS	NO UW NO UW OR BAD FEC OR BAD HEC
RANGING	1.NUMBER OF RANGING MESSAGES RECEIVED 2.NUMBER OF COLLIDED RANGING MESSAGES RECEIVED 3.NUMBER OF CORRUPTED RANGING MESSAGES	NO UW NO UW OR BAD FEC OR BAD HEC

**FIG.55**



**FIG.56**

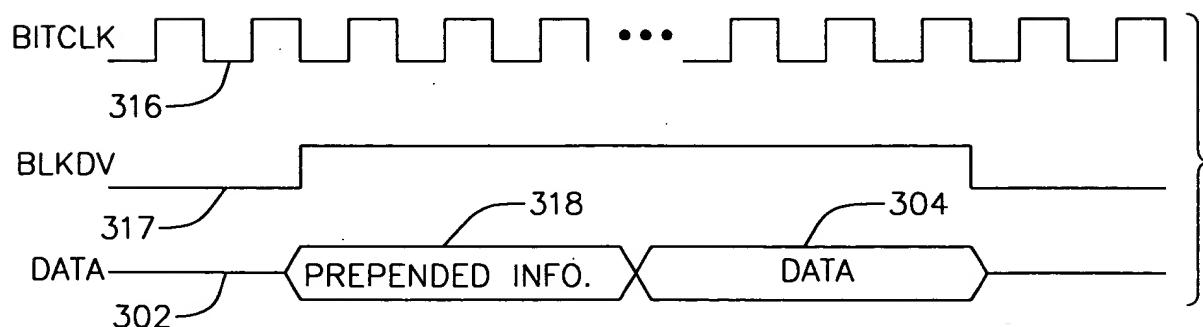


FIG. 57

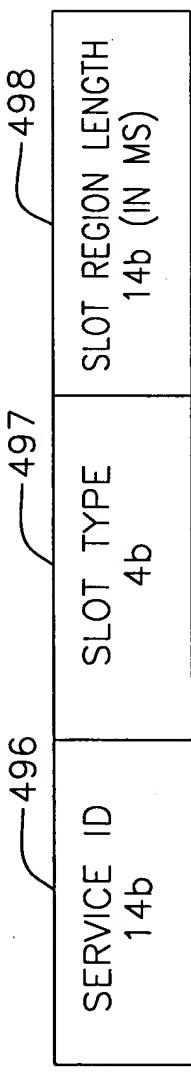


FIG. 58

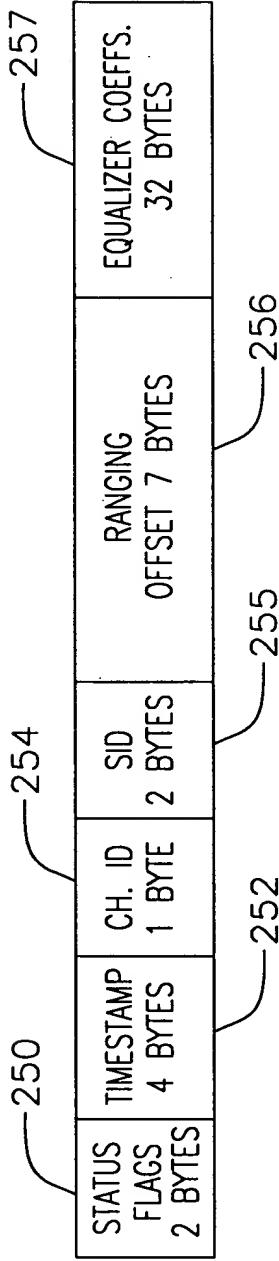


FIG. 59

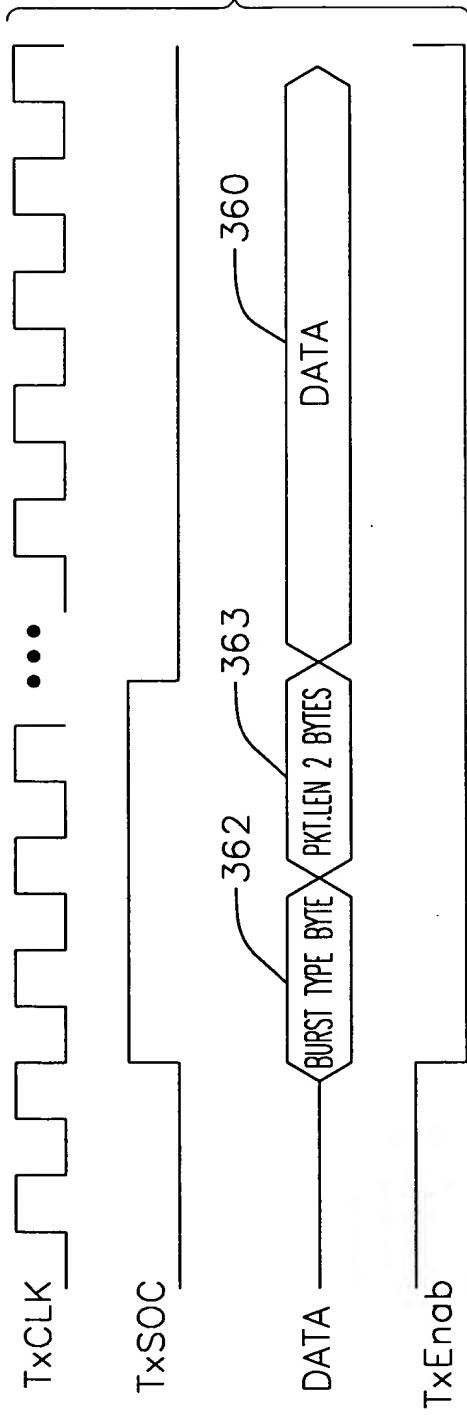


FIG. 60

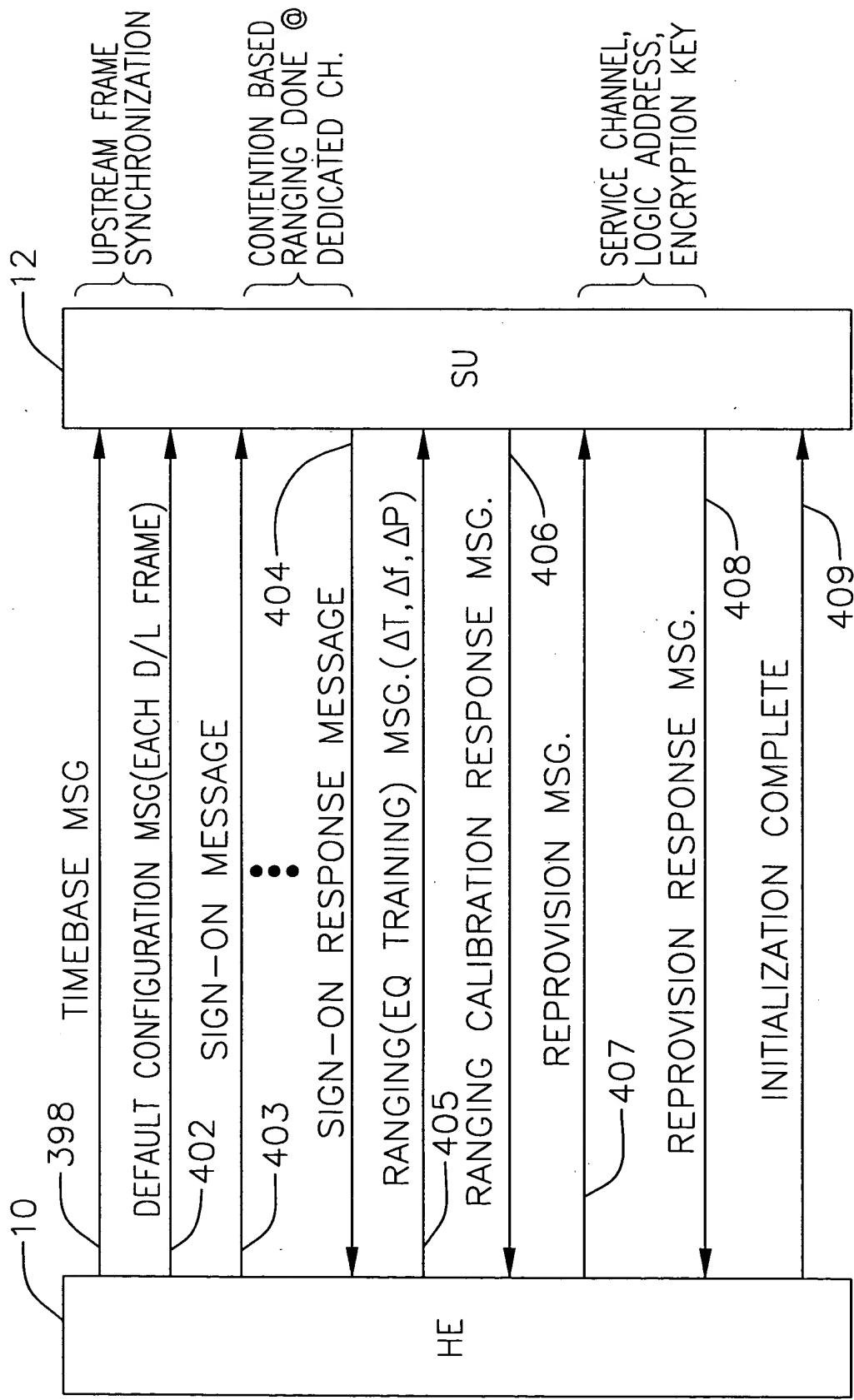
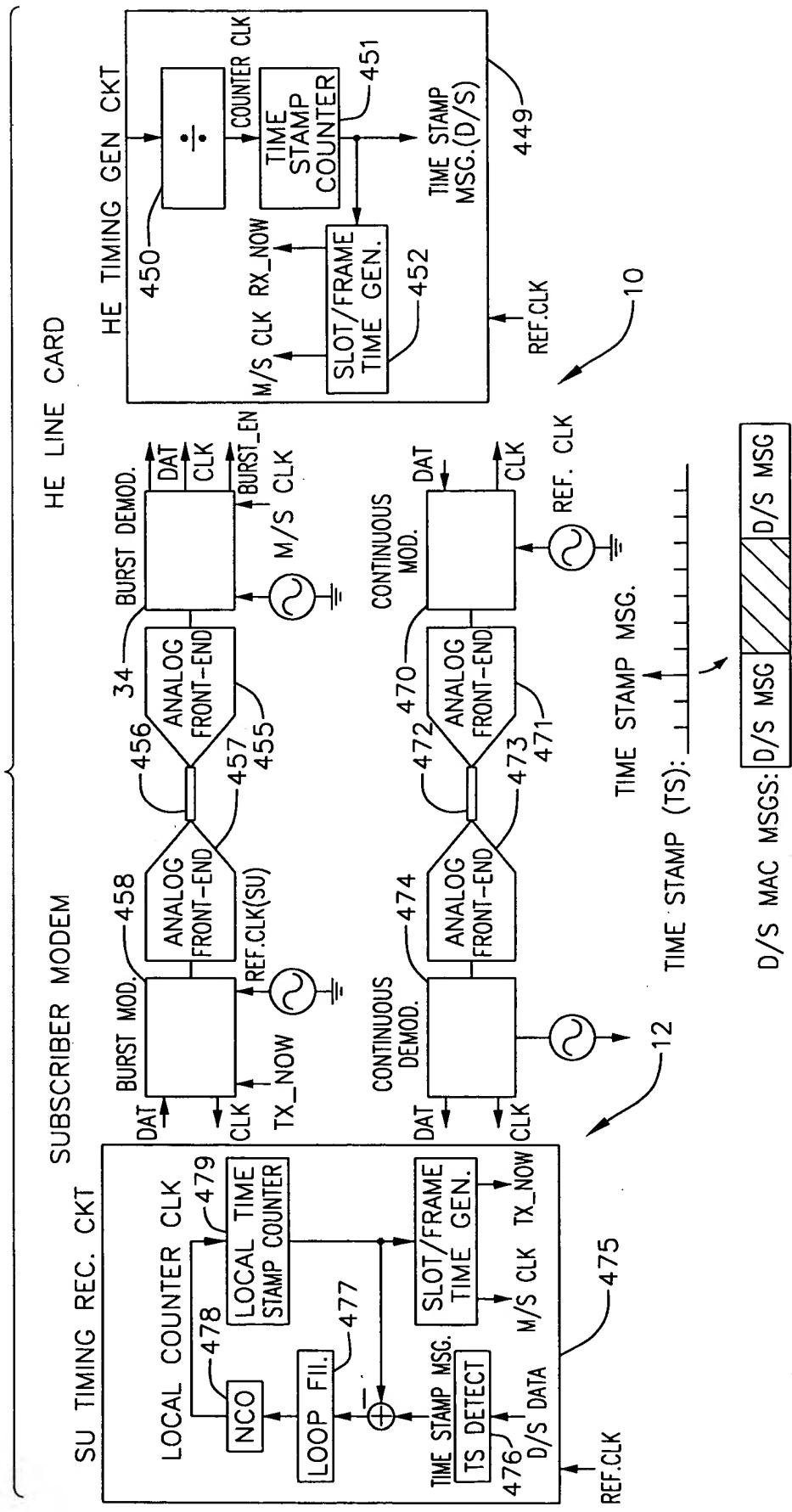
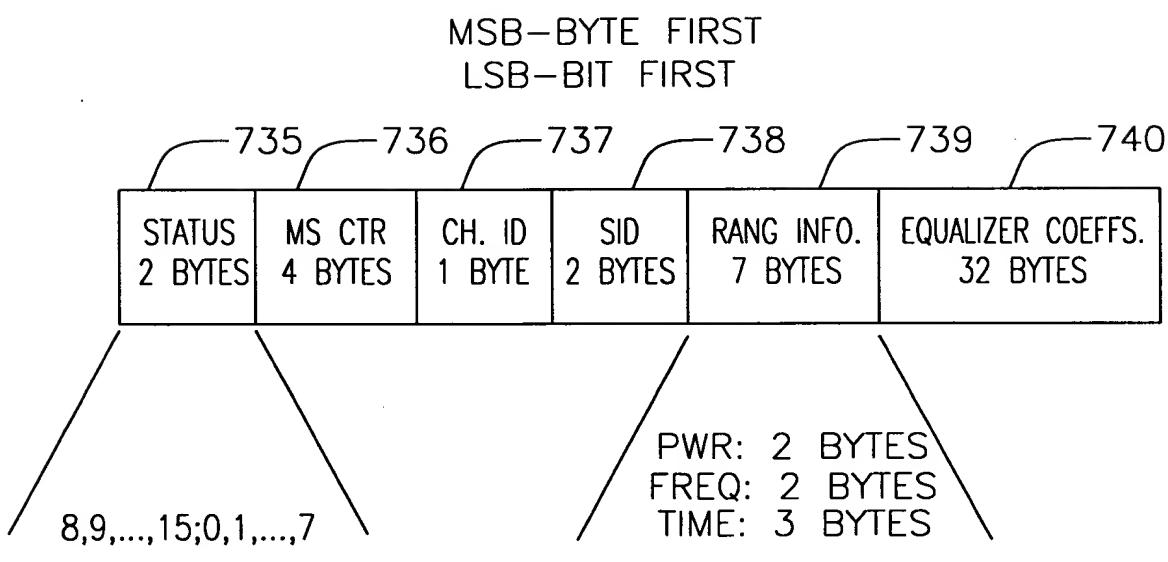


FIG. 61



*FIG. 62*



*FIG. 63*

BIT FIELD	DEFINITION IF BIT[11]=1	DEFINITION IF BIT[11]=0
BIT[15:12]	DOCSIS IUC	RESERVED
BIT[11]	1:INDICATES 1ST. BLOCK OF TRANSMISSION	0:INDICATES NOT 1ST. BLOCK OF TRANSMISSION
BIT[10]	1:INDICATES LAST BLOCK OF TRANSMISSION	1:INDICATES LAST BLOCK OF TRANSMISSION
BIT[9]	1:INDICATES RANGING REQUIRED	RESERVED
BIT[8]	RESERVED	RESERVED
BIT[7:5]	000:FEC OK 001:CORRECTABLE FEC ERROR 010:UNCORRECTABLE FEC ERROR 011:NO UNIQUE WORD DETECTED 100:COLLIDED PACKET 101:NO ENERGY 110:PACKET LENGTH VIOLATION	000:FEC OK 001:CORRECTABLE FEC ERROR 010:UNCORRECTABLE FEC ERROR 011:NO UNIQUE WORD DETECTED 100:COLLIDED PACKET 101:NO ENERGY 110:PACKET LENGTH VIOLATION
BIT[4]	1:VALID MINISLOT COUNT PREPENDED	RESERVED
BIT[3]	1:VALID CHANNEL ID PREPENDED	RESERVED
BIT[2]	1:VALID SID PREPENDED	RESERVED
BIT[1]	1:RANGING INFO PREPENDED	RESERVED
BIT[0]	1:EQUALIZER COEFFICIENTS PREPENDED	RESERVED

*FIG. 64*

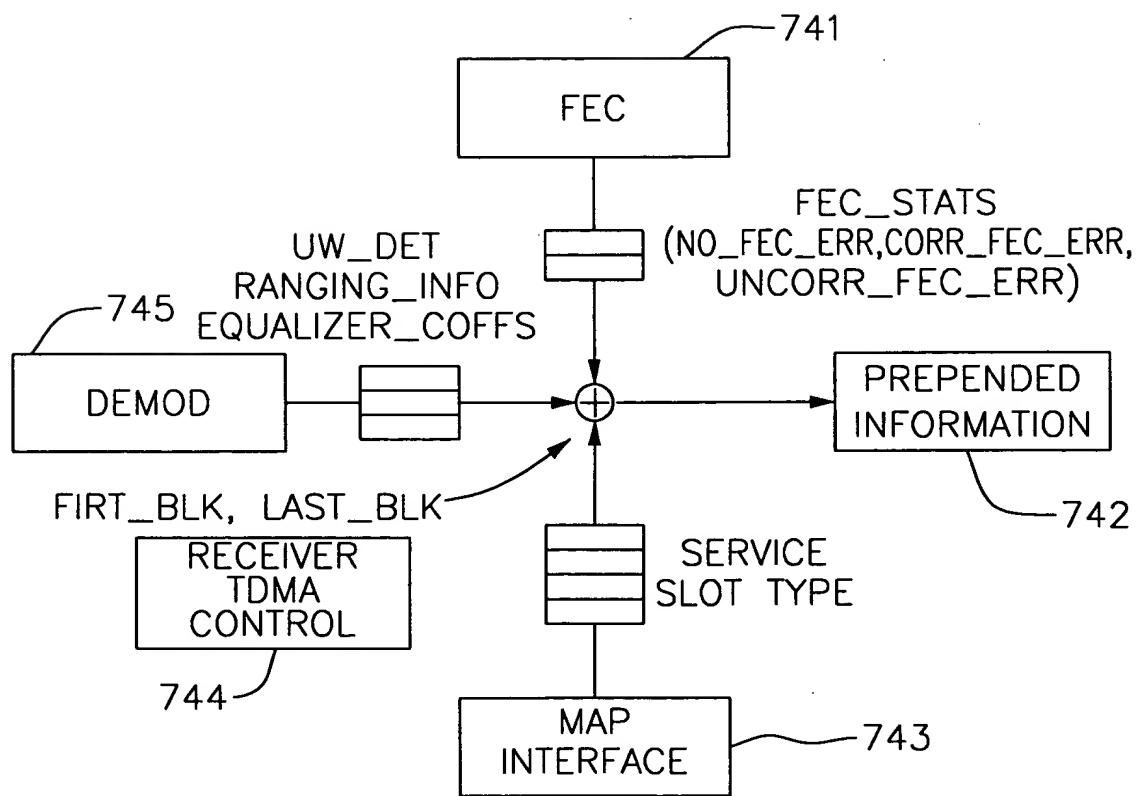


FIG. 65

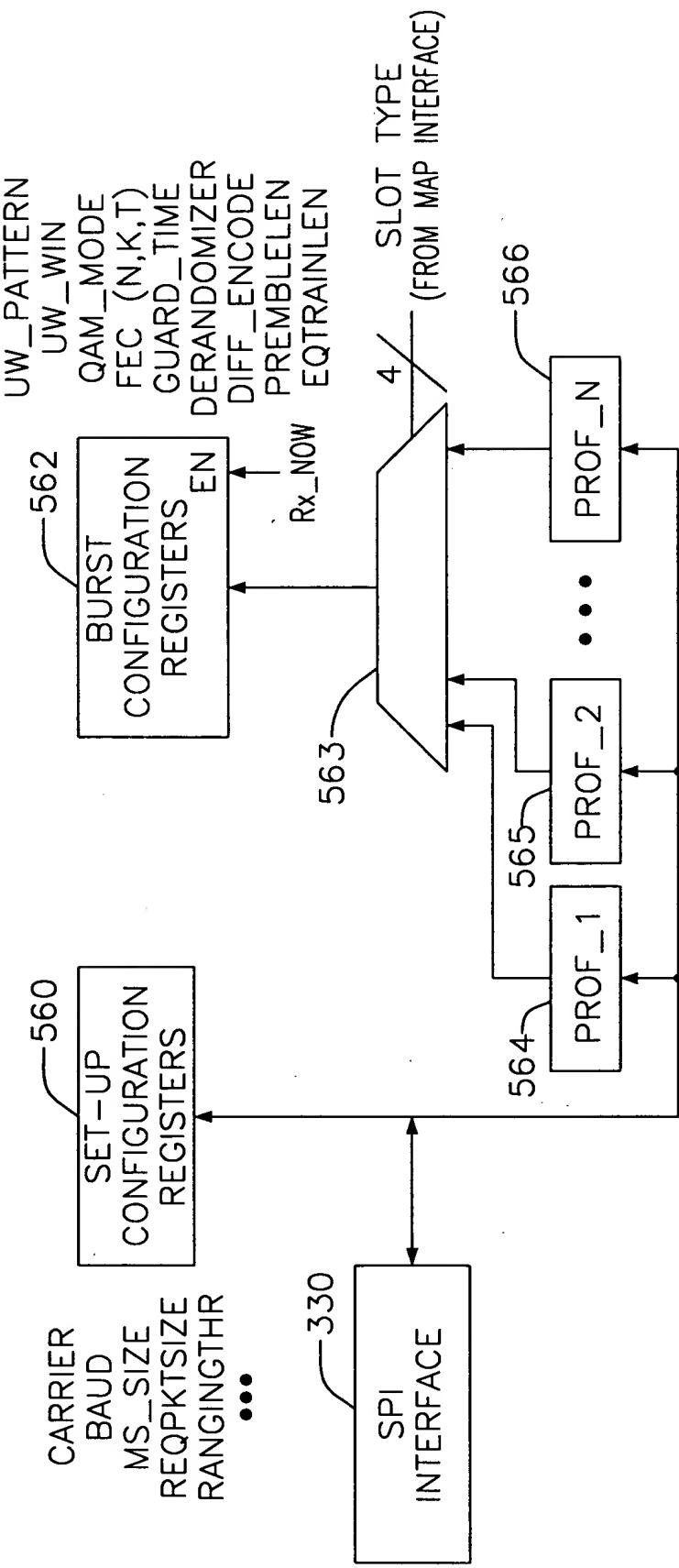


FIG. 66

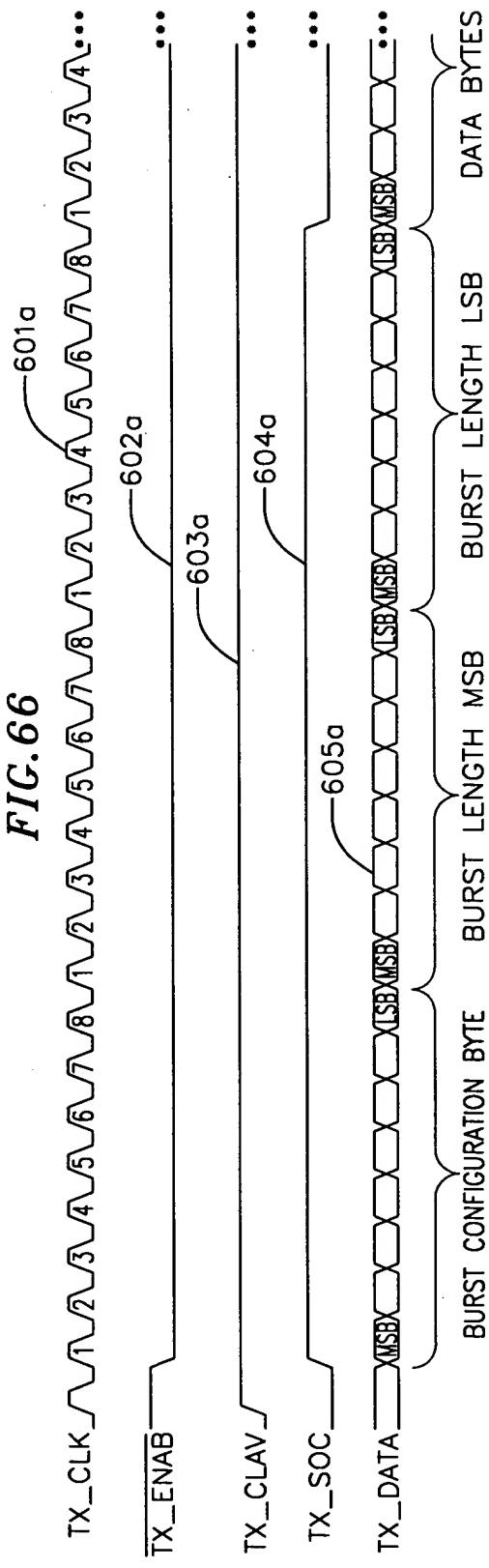


FIG. 67

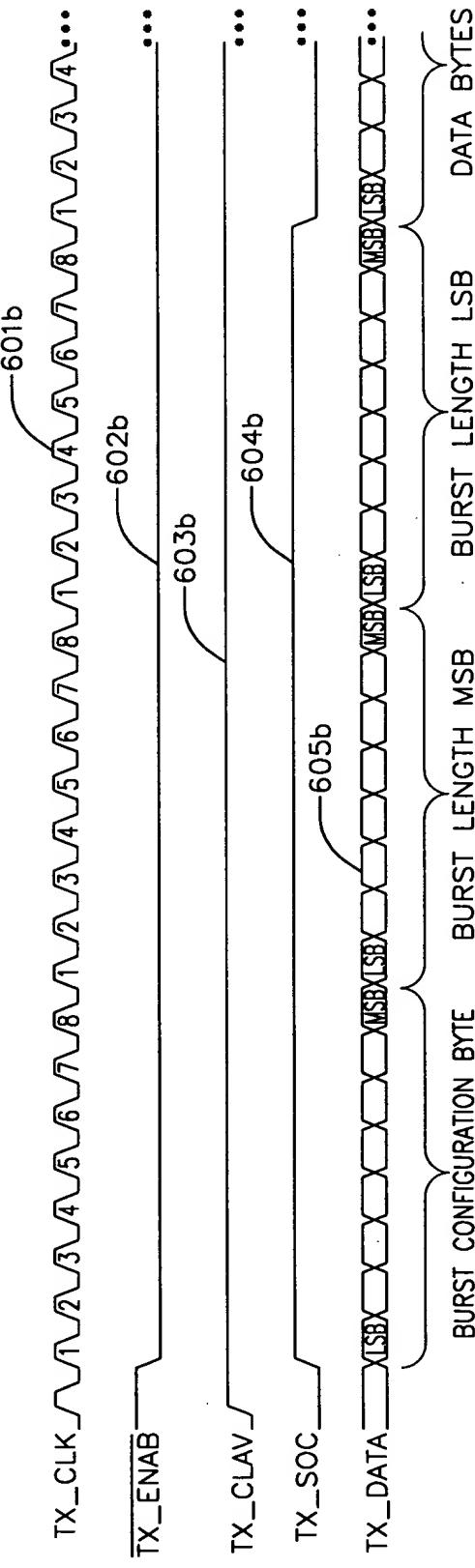
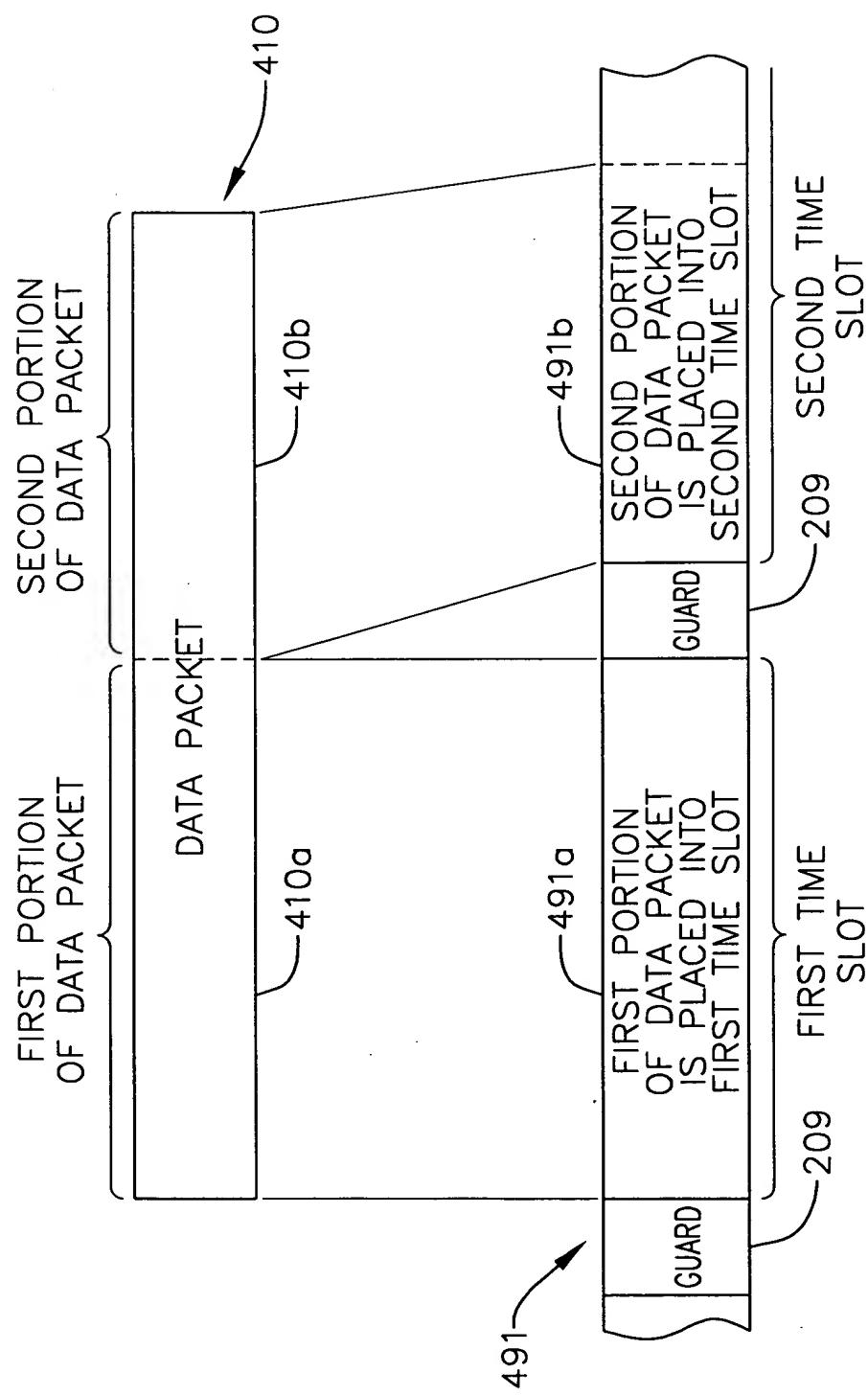
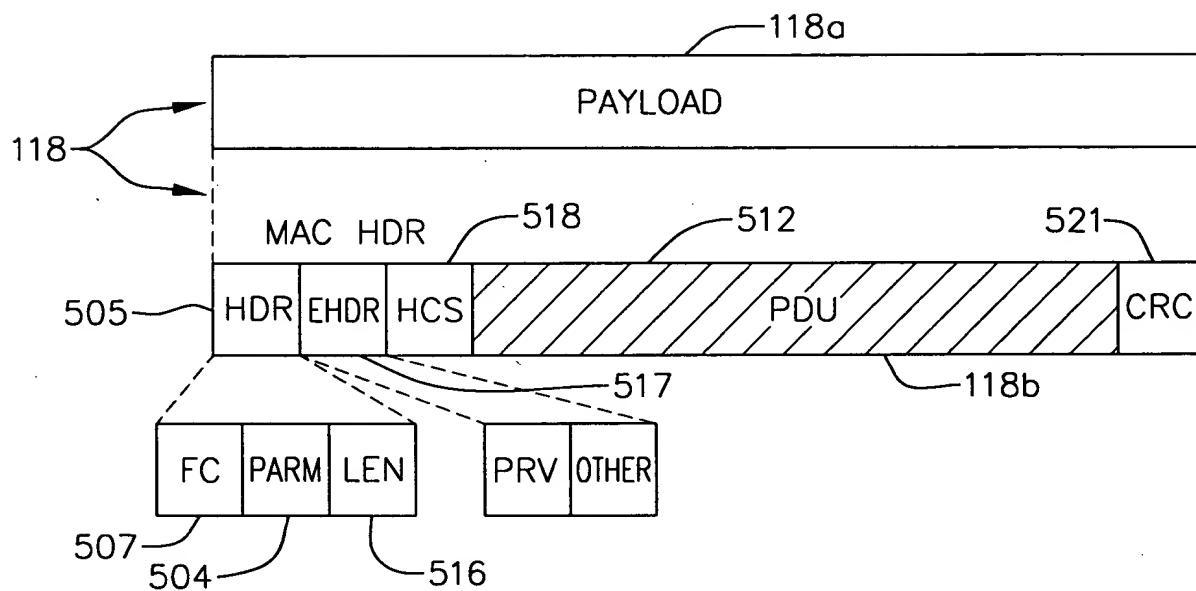


FIG. 68



*FIG. 69*



*FIG. 70*

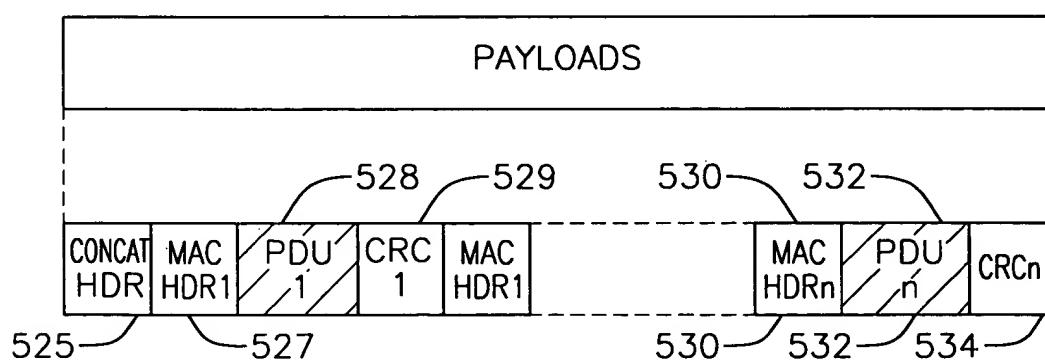


FIG. 71

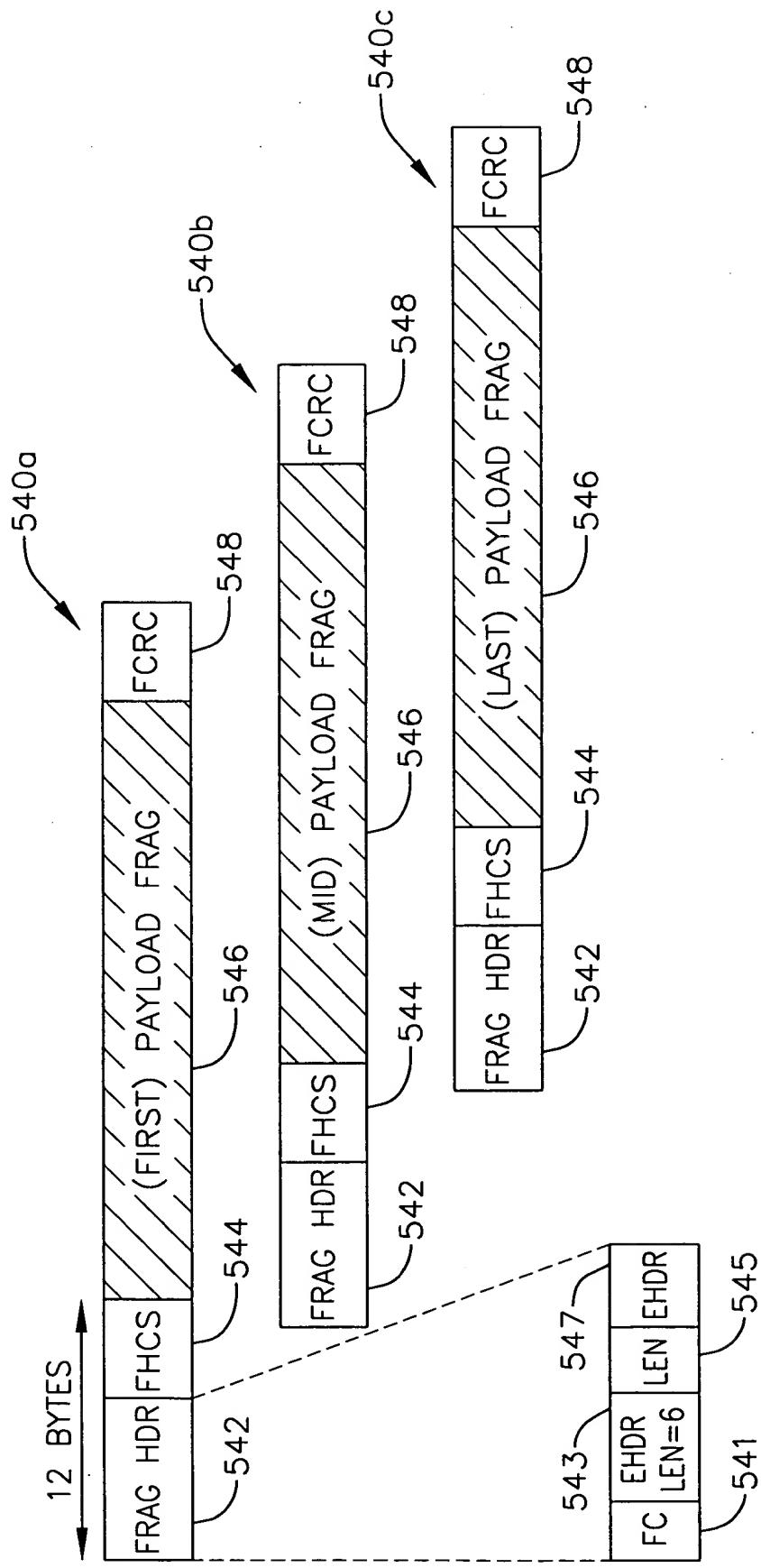


FIG.72

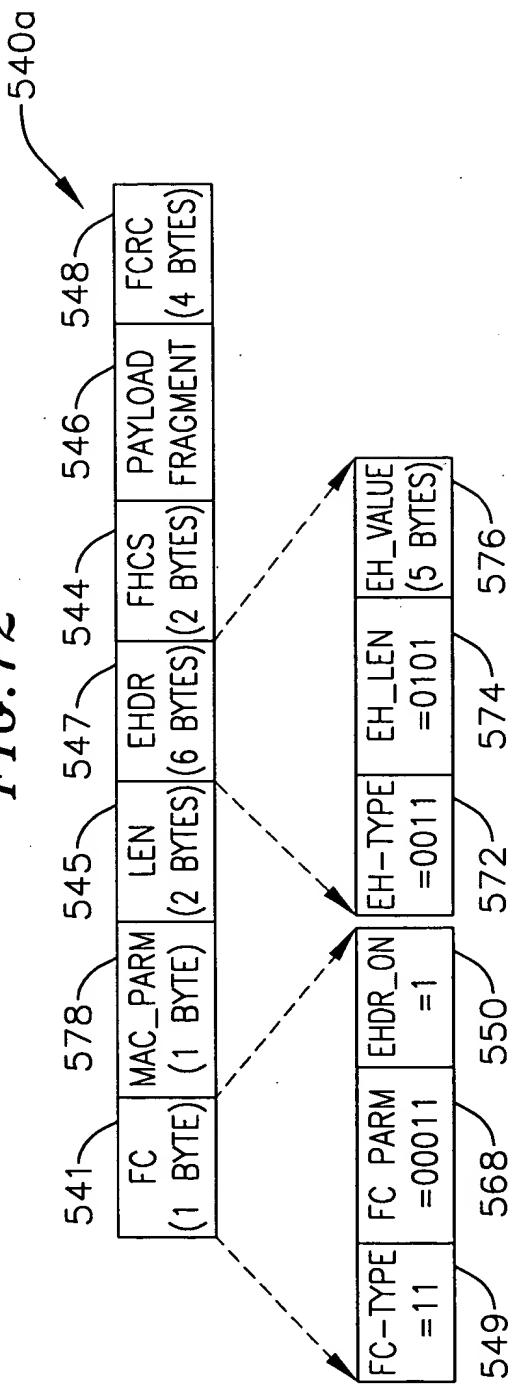


FIG.73

FIELD	USAGE	SIZE
FC	FC_TYPE=11;MAC-SPECIFIC HEADER FC_PARM [4:0]=00011;FRAGMENTATION MAC HEADER EHDR_ON = 1;FRAGMENTATION EHDR FOLLOWS	8 BITS
MAC_PARM	ELEN = 6 BYTES;LENGTH OF FRAGMENTATION EHDR	8 BITS
LEN	LEN = n+10;TOTAL LENGTH OF THIS FRAGMENT INCLUDING PAYLOAD, EHDR, FCRC	16 BITS

**FIG. 74**

FIELD	USAGE	SIZE
EHDR	<p>EH_TYPE=3; SAME TYPE AS BP_UP</p> <p>EH_LEN=5; LENGTH OF THIS EHDR</p> <p>KEY_SEQ; SAME AS IN BP_UP</p> <p>VER=0001; VERSION NUMBER FOR THIS EHDR</p> <p>ENABLE</p> <p>IF ENABLE=0, BPI DISABLED</p> <p>IF ENABLE=1, BPI ENABLED</p> <p>TOGGLE BIT; SAME AS IN BP_UP</p> <p>SID; SERVICE ID ASSOCIATED WITH THIS FRAGMENT</p> <p>REQ; NUMBER OF MINI-SLOTS FOR A PIGGYBACK REQUEST</p> <p>RESERVED; MUST BE SET TO ZERO</p> <p>FIRST_FRAG; SET TO ONE FOR FIRST FRAGMENT ONLY</p> <p>LAST_FRAG; SET TO ONE FOR LAST FRAGMENT ONLY</p> <p>FRAG_SEQ; FRAGMENT SEQUENCE COUNT, INCREMENTED FOR EACH FRAGMENT, SET TO ZERO FOR FIRST FRAGMENT</p>	<p>4 BITS</p> <p>4 BITS</p> <p>4 BITS</p> <p>4 BITS</p> <p>1 BIT</p> <p>1 BIT</p> <p>14 BITS</p> <p>8 BITS</p> <p>2 BITS</p> <p>1 BIT</p> <p>1 BIT</p> <p>4 BITS</p>
FHCS	MAC HEADER CHECK SEQUENCE	2 BYTES
PAYOUT	FRAGMENT PAYLOAD; PORTION OF TOTAL MAC PDU BEING SENT	n BYTES
FCRC	CRC ACROSS FRAGMENT PAYLOAD	4 BYTES
	LENGTH OF A MAC FRAGMENT FRAME	n + 16 BYTES

FIG. 75

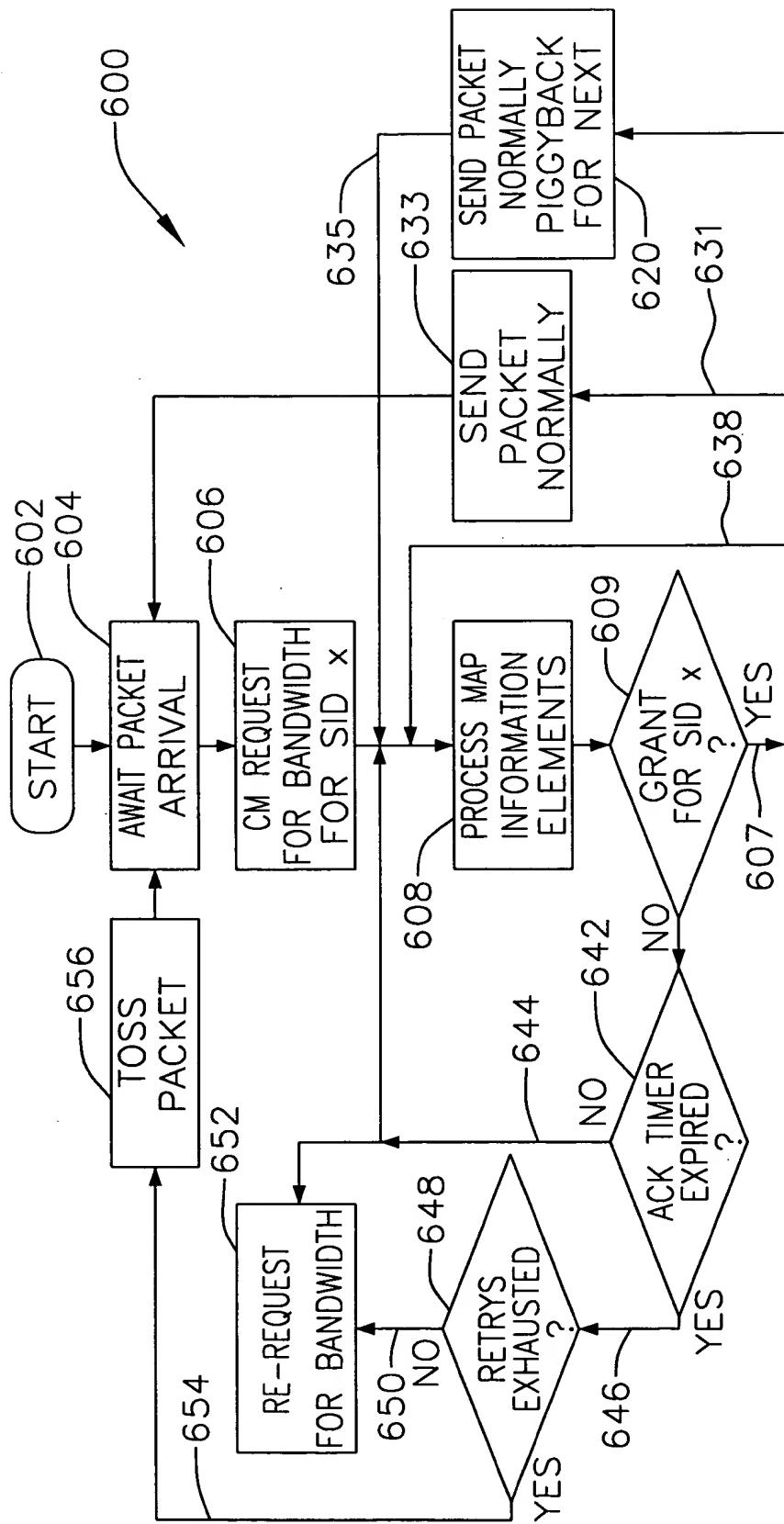
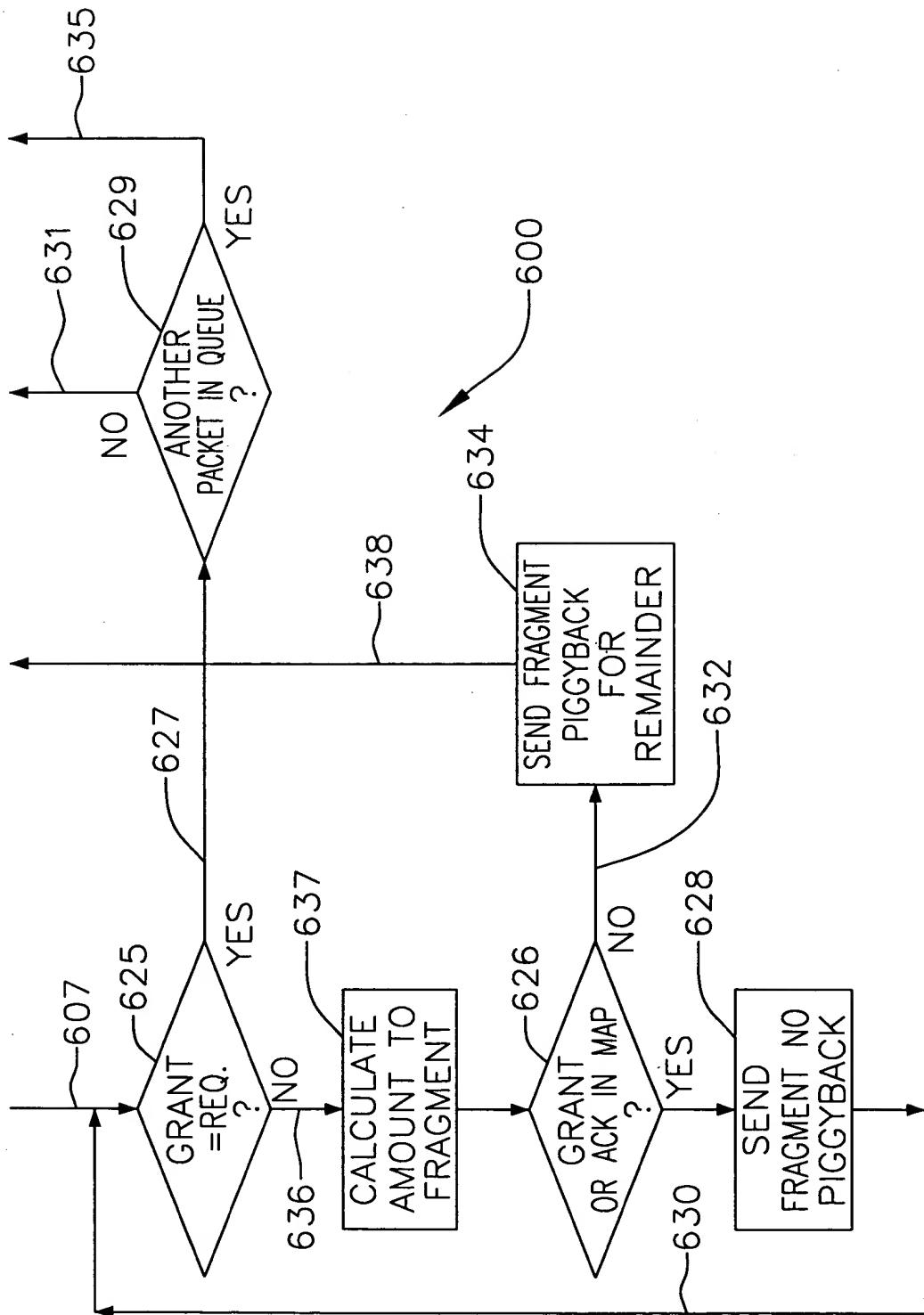


FIG. 76



**FIG. 77**

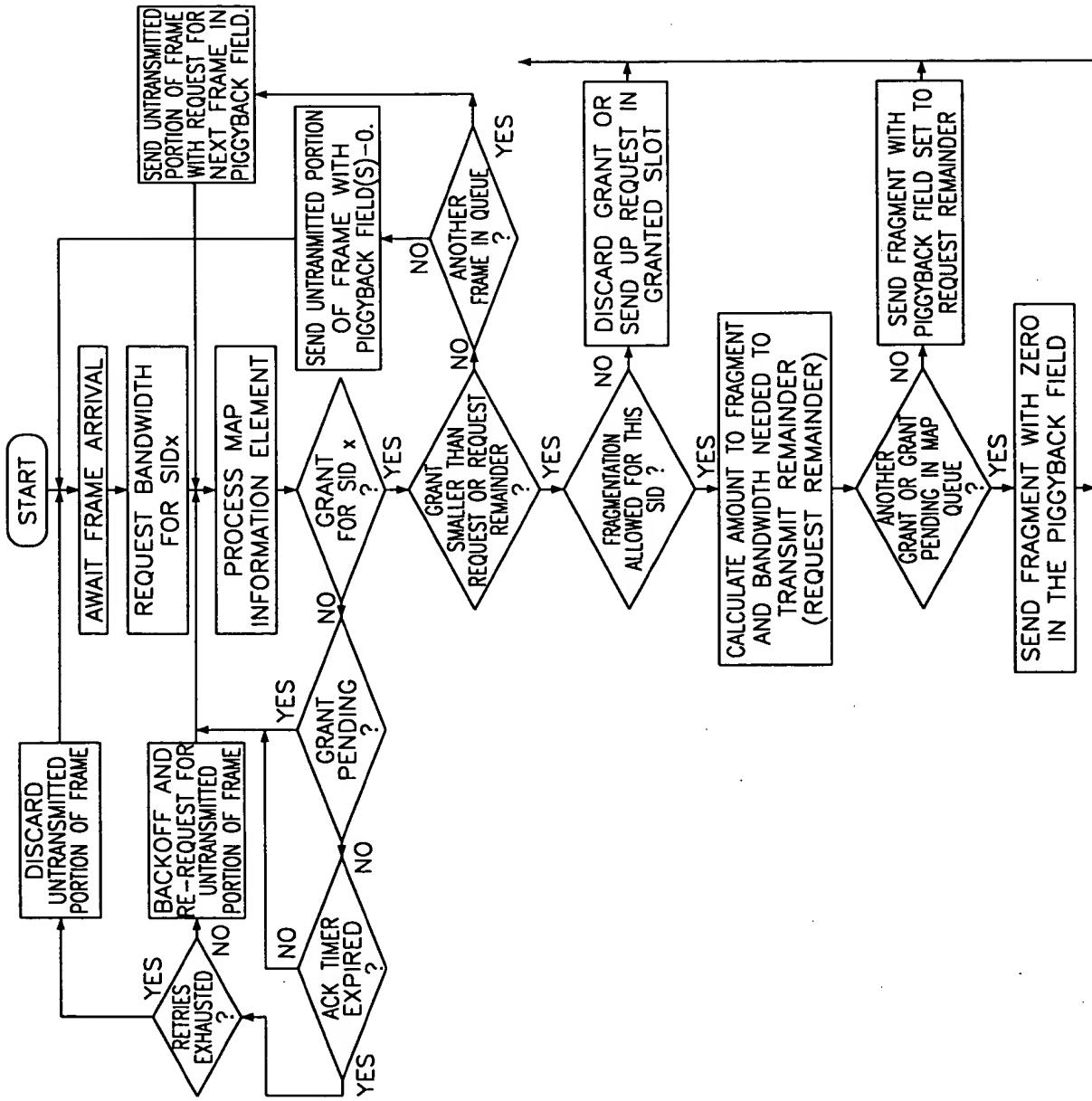
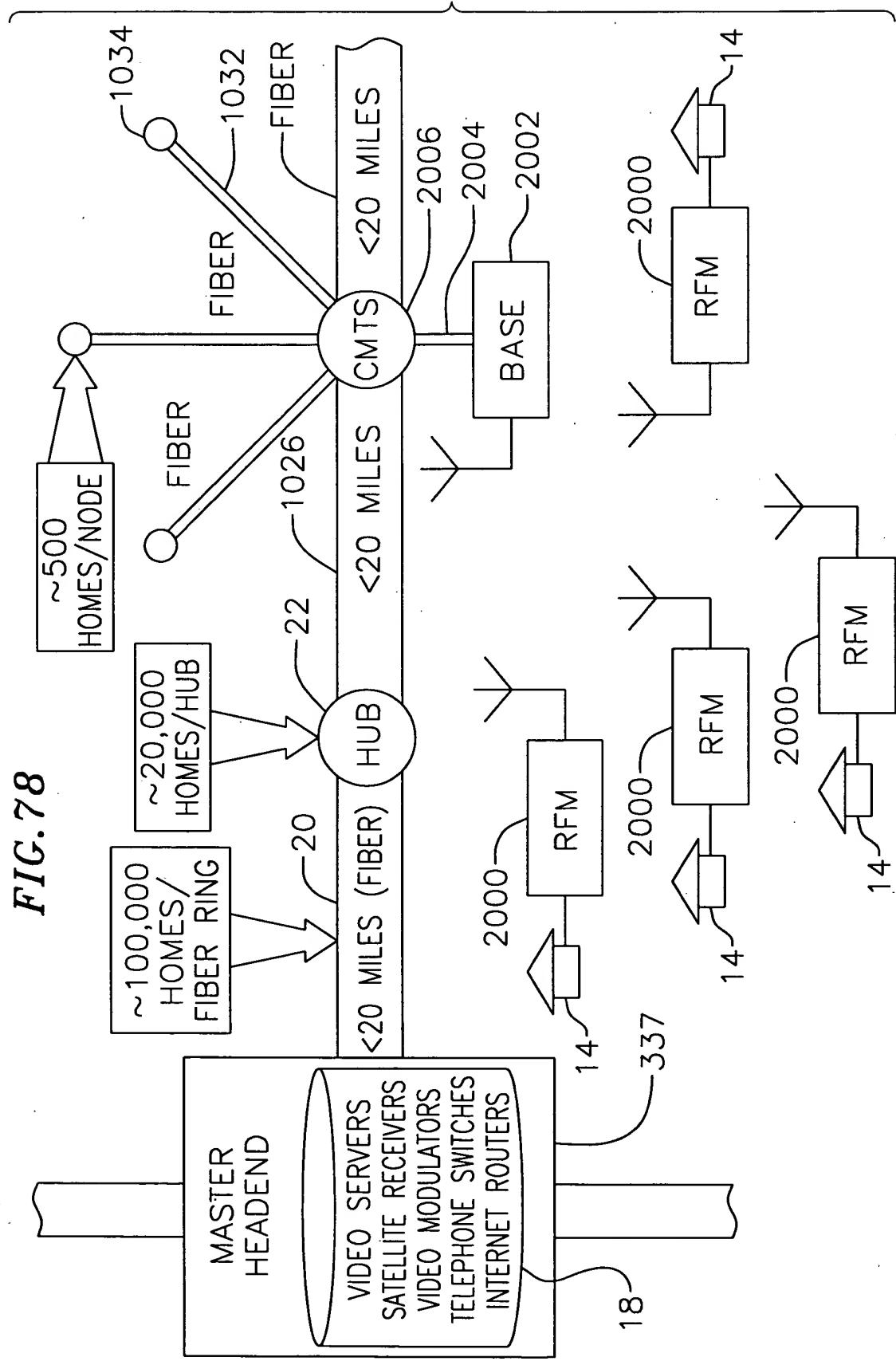
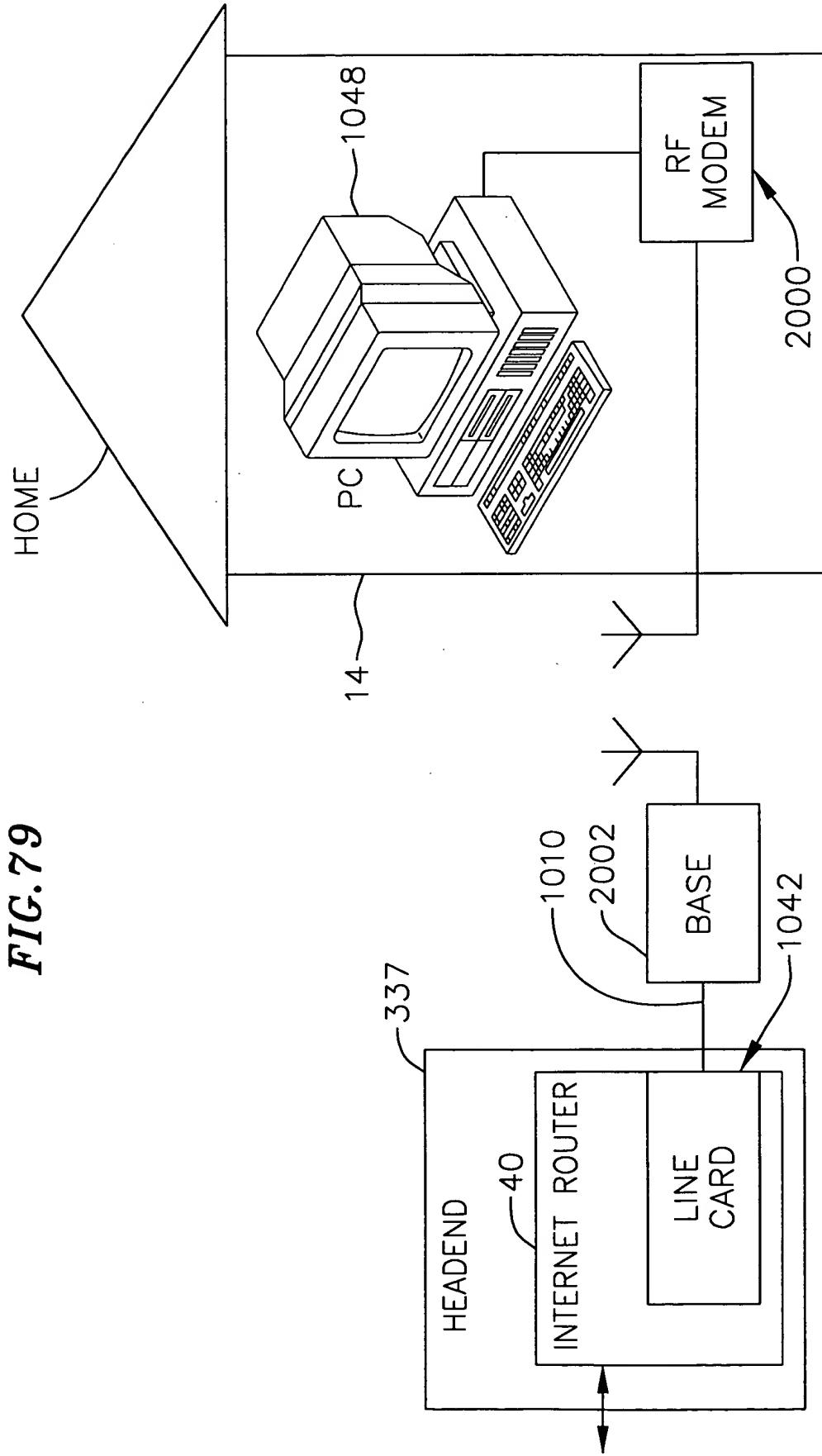


FIG. 78



**FIG. 79**



*FIG. 80*

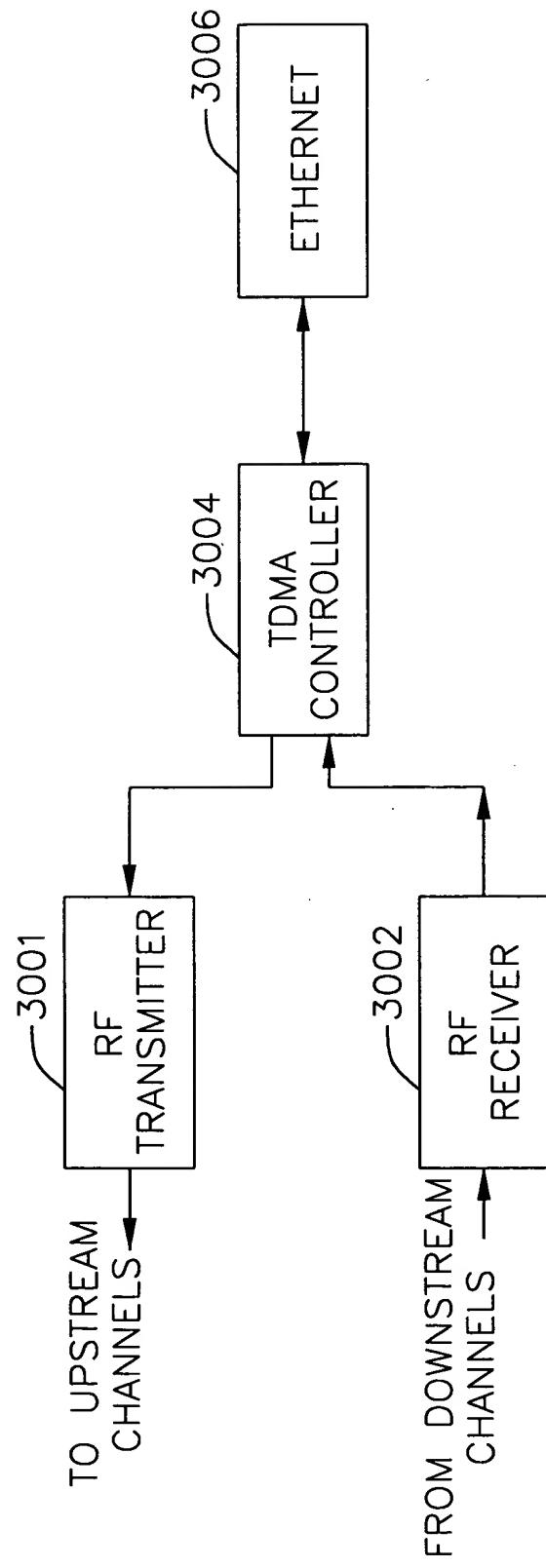


FIG. 81

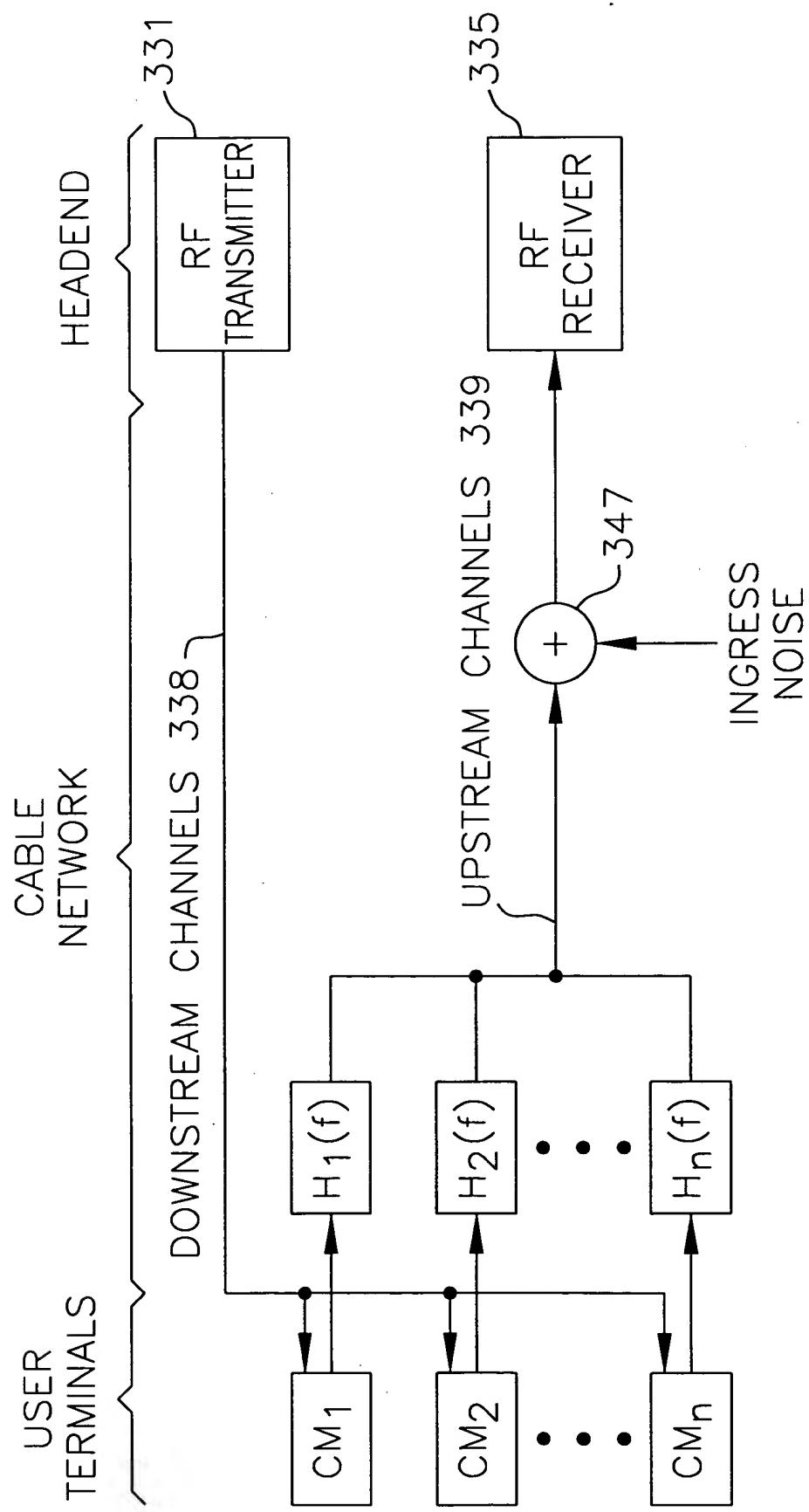
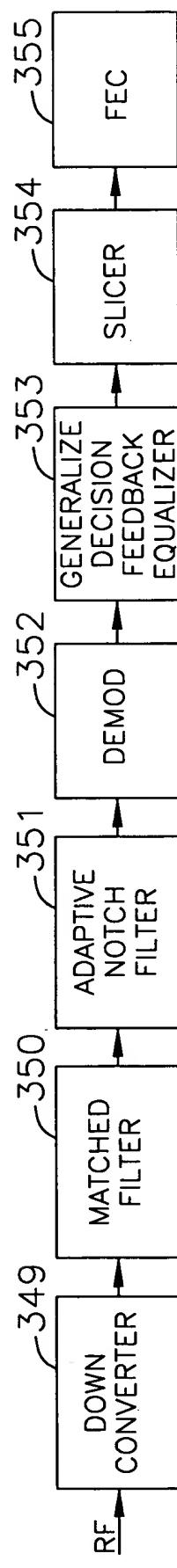
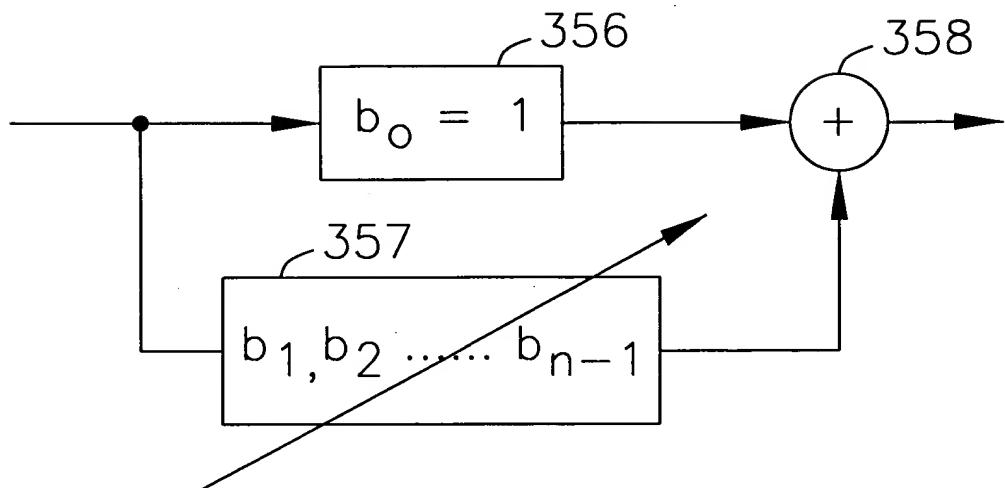


FIG. 82



*FIG.83*



*FIG.84*

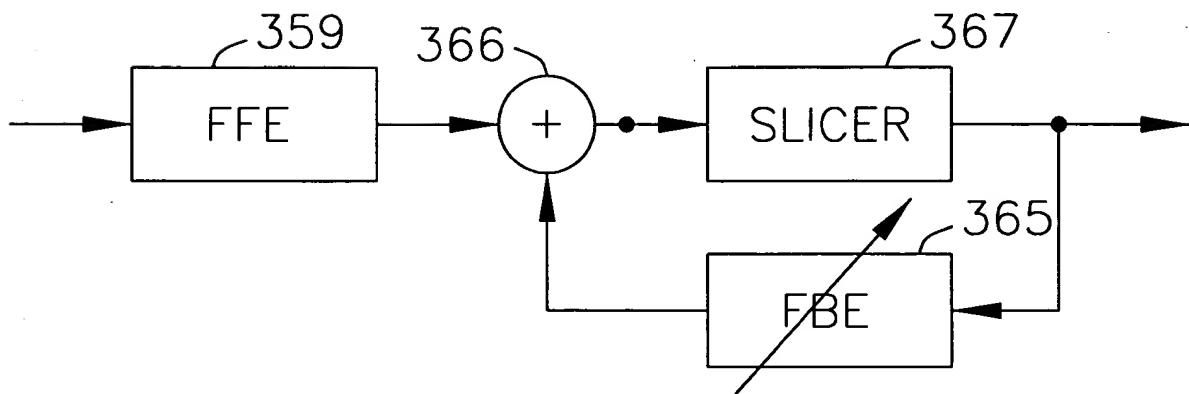


FIG. 85

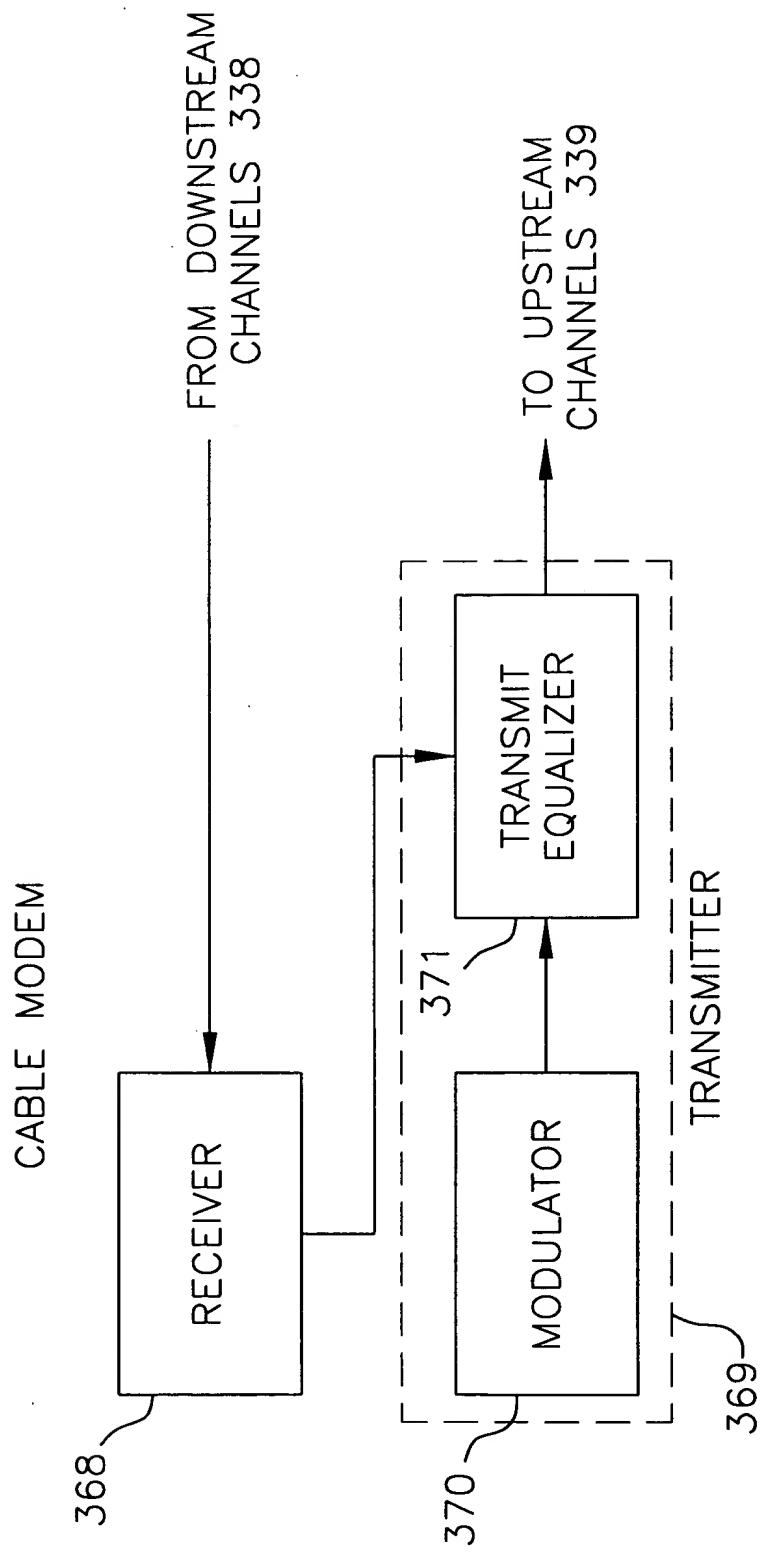
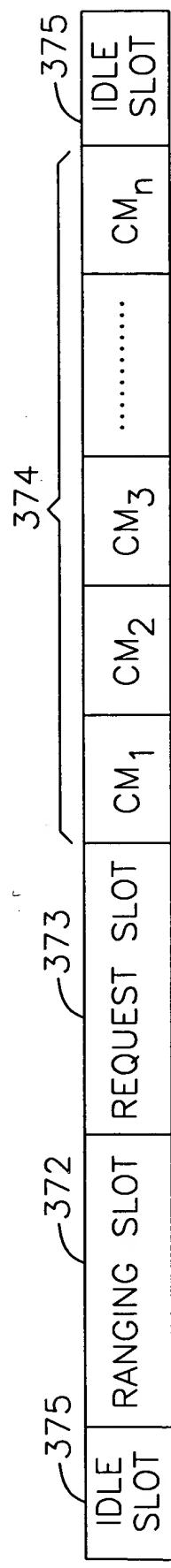
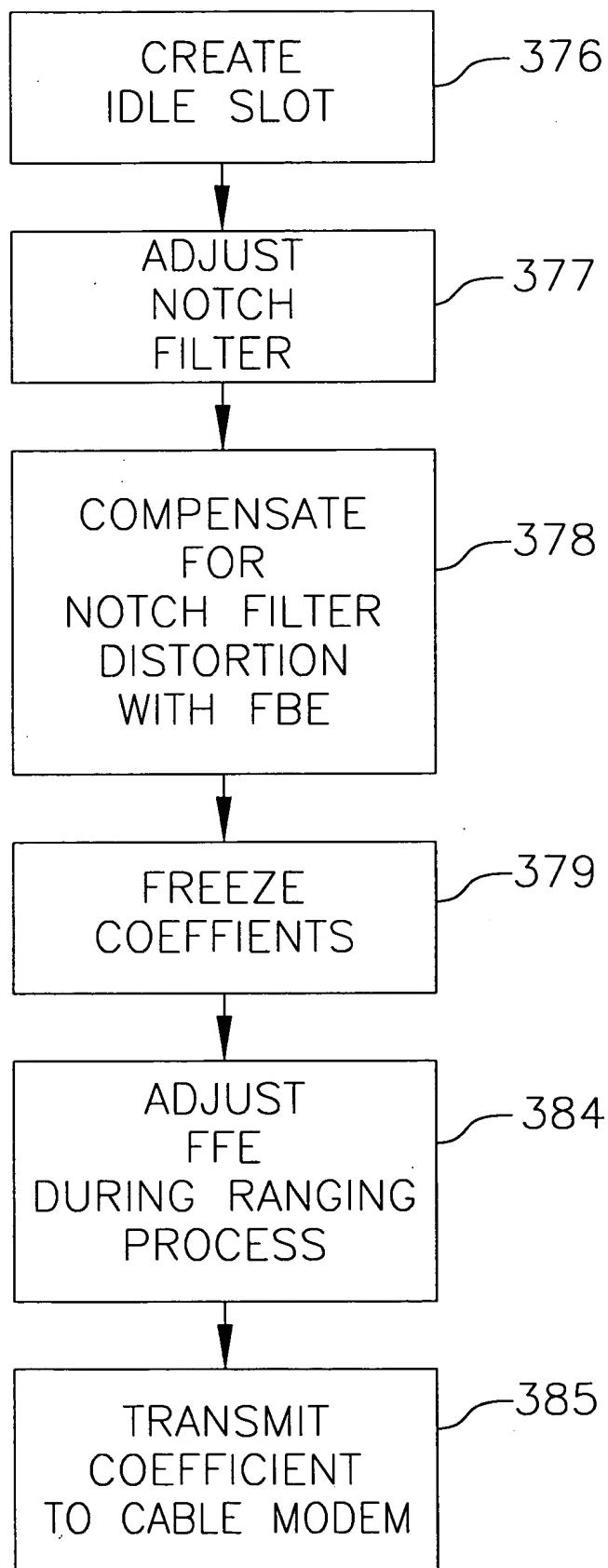


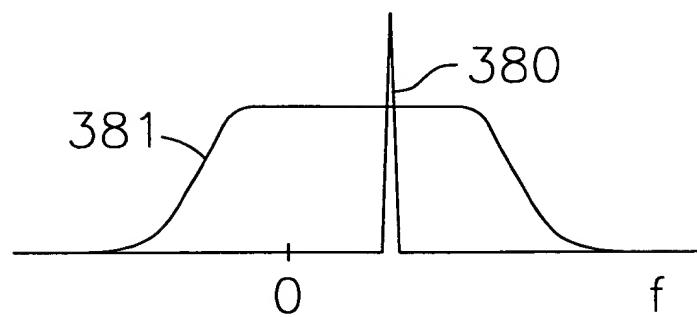
FIG. 86



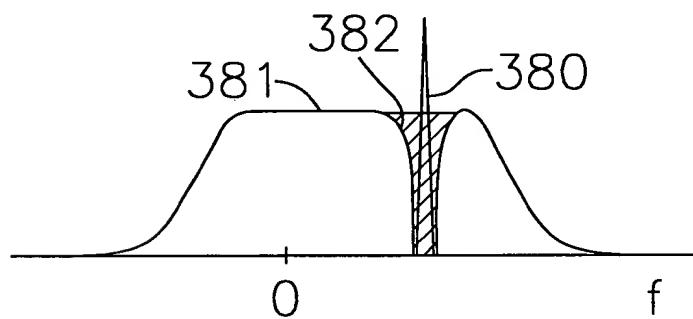
**FIG.87**



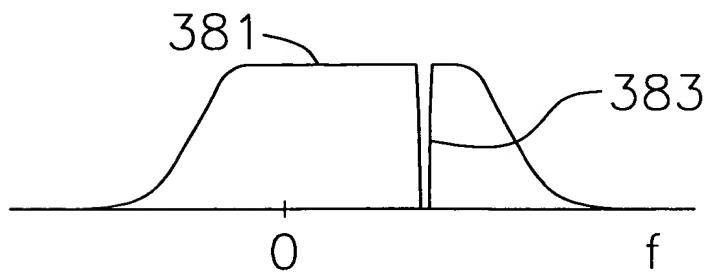
*FIG. 88A*



*FIG. 88B*

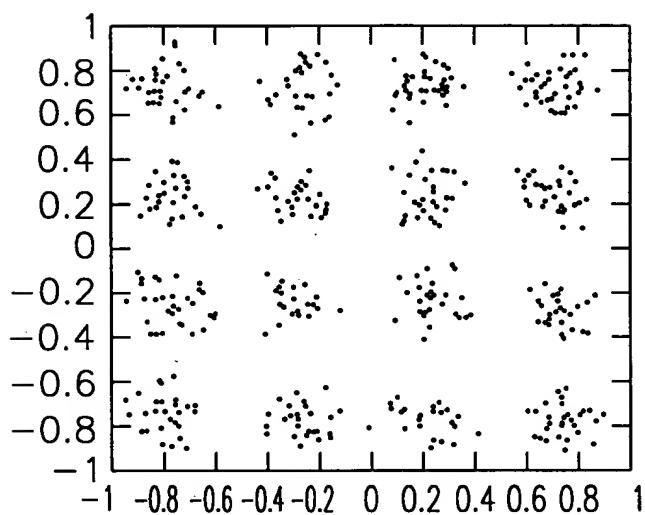


*FIG. 88C*



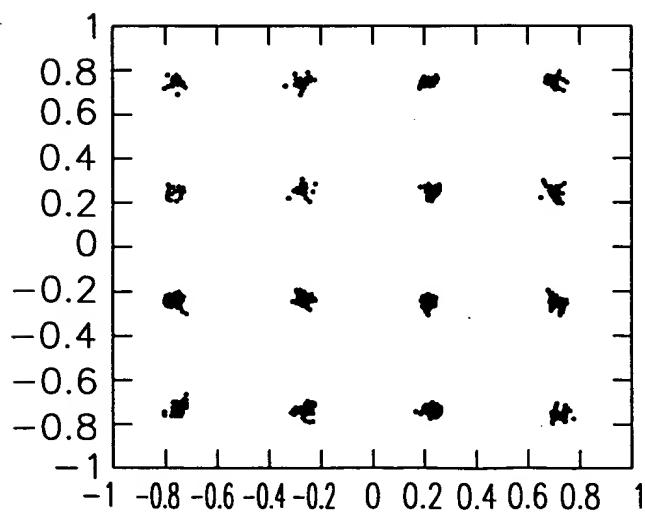
**FIG. 89A**

16-QAM CONSTELLATION  
BEFORE NOISE REJECTION

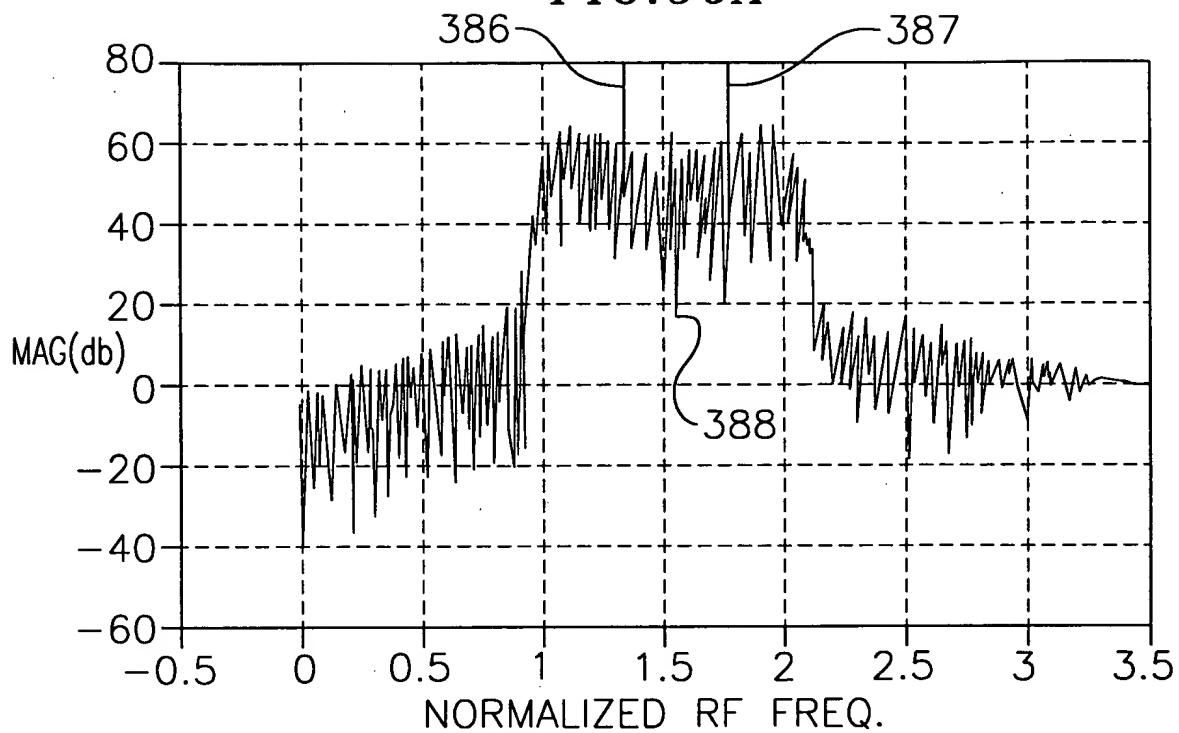


**FIG. 89B**

16-QAM CONSTELLATION  
AFTER NOISE REJECTION



**FIG. 90A**



**FIG. 90B**

